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NOVEMBER 1996

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the System 7.5 Update 2.0, please visit **//www.microsoft.com/macoffice/**. Or to order a free Microsoft Empowerment Pack for the Mac, which includes a CD-ROM with the software listed above plus a special offer on RAM from Kingston, Technology call 800-469-6520 Dept. MCA.

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# Macworld

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**— MACWORLD OCT. '96**

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128 bit graphics accelerator. The list doesn't end here, but some things you just have to see for yourself. Sure there will be followers, but it'll be a long time before anyone ♟♟♟♟♟ MacUser ZD LABS even gets close. Call now to custom configure your dream system.

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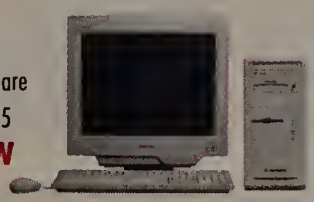

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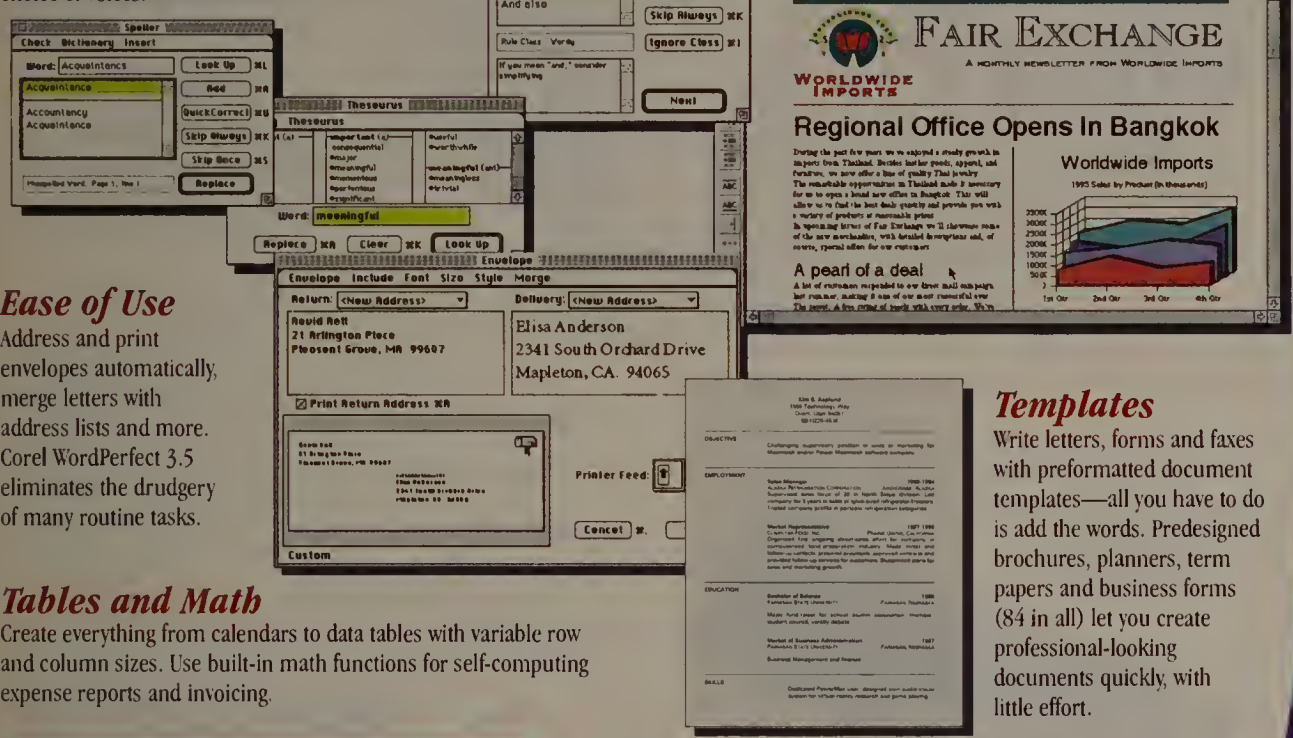


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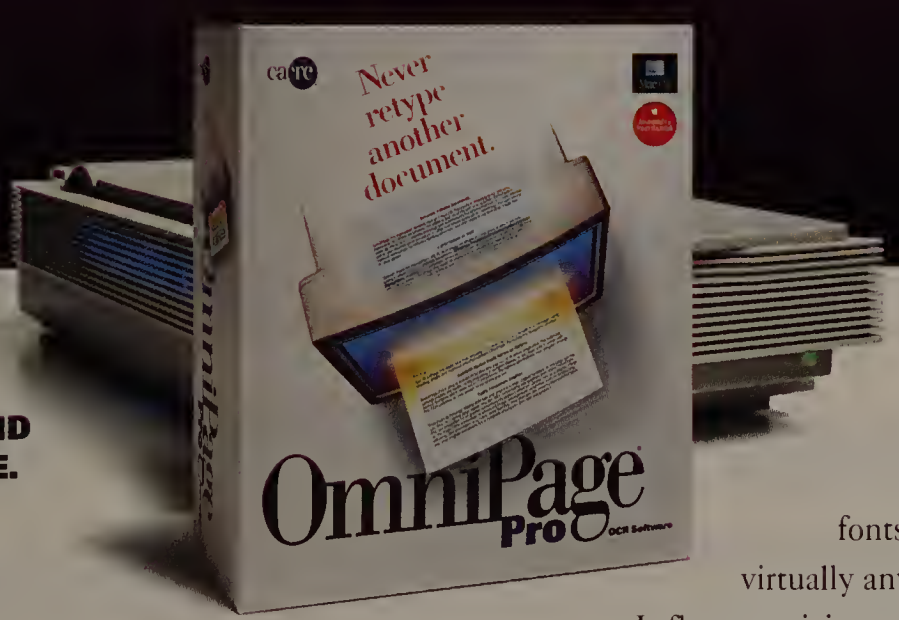


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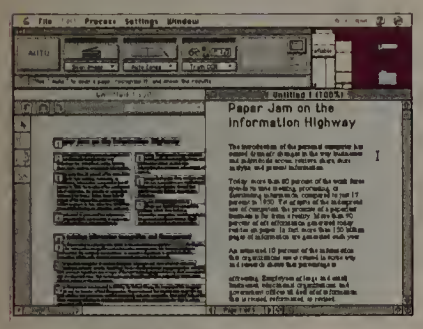


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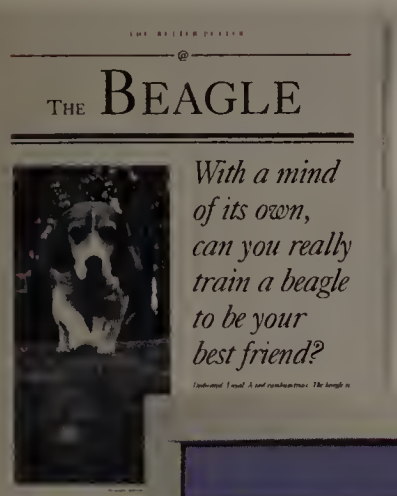


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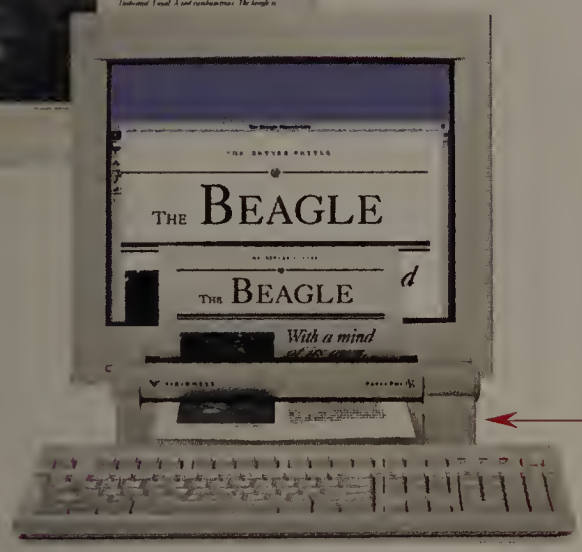

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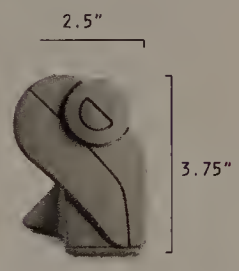


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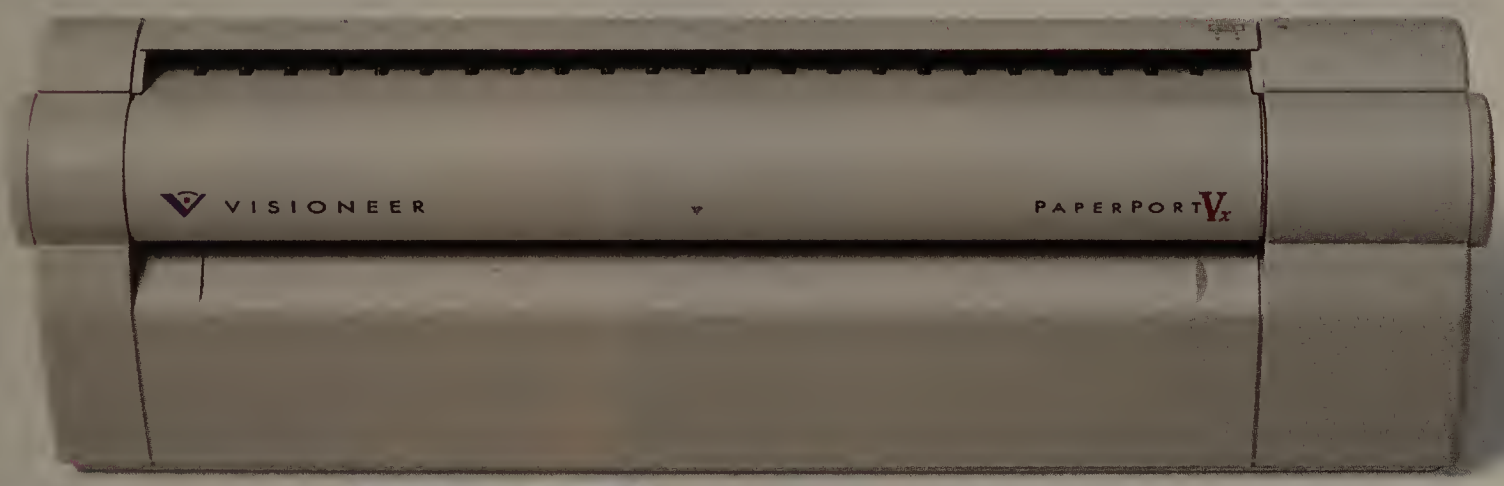


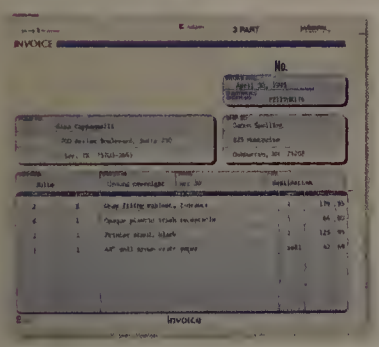


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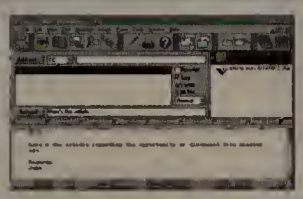

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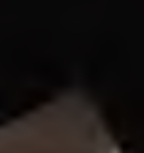

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# Letters

## The Honeymoon Is Over

CONGRATULATIONS TO GALEN GRUman for an accurate assessment of the Microsoft-Apple hoax ("The Honeymoon Is Over," Macworld Online, *http://www.macworld.com/daily/daily.384.html*). The legendary arrogance of both companies will surely come home to roost someday. We recently purchased and registered a 9500 and 5300c. The Mac OS twists and turns have been a nightmare.

As a disgruntled and struggling user of Microsoft's productivity suite, I have found and continue searching for alternatives to Word and Excel. To install both applications on our computers required a grand total of 56 floppies. Enough already!

MELODY DRAKE
*via Macworld Online*

## Even More Best Web Sites

I CAME ACROSS THE POWER COMPUTING site mentioned in "The Best Mac Web Sites" (August 1996)—the one that allows you to build your dream system and check out the price tag—but when I tried the URL given, I found myself on the Web page of Australia's largest distributor of IBM computers! I hope that wasn't a Freudian slip.

DOUG KORWIN
*via Macworld Online*

*Maybe that's why Power Computing was so eager for* Macworld *editors to bungee jump at the Boston Macworld Expo . . . naw. That URL should've been* http://www.powercc.com.—*Ed.*

IN "THE BEST MAC WEB SITES" YOU LEFT out the two most important Web sites for anyone wanting to keep track of what's going on in the Mac world: the Macintosh

Resource Page (*http://www.macresource.pair.com/*) and the MacInTouch Page (*http://www.macintouch.com/*). These pages are absolutely essential to my life, and I can't believe that they were left out!

THOMAS REED
*St. Louis, Missouri*

IN "THE BEST MAC WEB SITES," HOWARD Baldwin writes: "Like the ocean, the Web is a vast and murky place. Diving in randomly, you're just as likely to discover a clear, clean Macintosh site as a clunky site posted by a 14-year-old fan of Smashing Pumpkins." What exactly does he mean by that? I am a 14-year-old, and a fan of The Smashing Pumpkins. Does this mean for some reason that I am not organized or computer literate? Just because I am not a pocket-protector–clad math whiz doesn't mean I don't know anything about computers, the Internet, and the World Wide Web. I read *Macworld* and can program in C and Pascal. I also listen to Nirvana and play electric guitar. Baldwin could have made his point just as well if he had said "a clunky site with pictures that didn't load and missing links" instead of resorting to the use of a cheap stereotype.

M. WEYANDT
*via the Internet*

*As a pocket-protector–clad math whiz, might I ask what you meant by that?—Ed.*

## Don't Forget 1's and l's

OUR FRIEND DAVID BLATNER STRIKES again (*Publishing Workshop*, August 1996). His short, to-the-point column should be required reading for all computer users. As an instructional technologist, getting my students to use indents instead of tabs is my most difficult task. Now, if I could only get those boys and girls to stop using double spaces after periods, I'd have it made.

ALAN APPLEGATE
*Littleton, Colorado*

## Names We Love to Hate

KUDOS TO DAVID POGUE FOR HIS TERrific, funny article on product naming and numbering. He left out two of the most blatant naming-protocol violations, however: HoTMetaL Pro and—the absolute worst product name ever—theFONDler. Ugh!

RAUL REGALADO
*via America Online*

I GOT A GOOD LAUGH OUT OF DAVID Pogue's column about product names, particularly his comments on the arbi-

*continues*

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## CORRECTIONS

- *The phone number for Power Computing ("High-Performance Systems,"* Reviews, *October 1996) is 512/388-6868.*
- *The phone number for STF Technologies ("Faxstf 3.2,"* Reviews, *October 1996) is 816/463-1412.*
- *DayStar Digital's phone number is 770/967-2077 ("The New Speed Champs," July 1996).*
- *Immedia will require QuarkXPress 3.32 or later to run (*News, *August 1996).*
- *The Practical Peripherals MacClass 288 V.34 PC Card modem has a five-year warranty ("PC Card Modems," July 1996).*
- *The Editors' Choice box in "Best Buys in Optical Drives" (October 1996) for the 2.6GB Optical Drive is as follows:*

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trary use of upper- and lowercase letters in product names. Imagine my surprise when I turned the page and saw an entire article on "AutoDesk"!

AMELIE VON FLUEGGE, AUTODESK
*San Rafael, California*

DAVID POGUE FORGOT THE MOST commonly made intercap mistake: MacIntosh.

HEATH HANLIN
*via Macworld Online*

SO YOU DON'T LIKE THE NAME WOW for CompuServe's new service? Since the service includes censoring of content, maybe the name is appropriate. Upside down it's MOM.

TOM KELLER
*via CompuServe*

THOUGH WE ARE GRATIFIED THAT *Macworld* has finally taken some notice of our CD-ROM work of art, ScruTiny in the Great Round, it was curious to find it on a list of the five worst Mac product names (*The Desktop Critic*, August 1996). David Pogue complains that you'd never be able to tell from the title that this is a CD-ROM, that the title "not only conveys no information, but implies a double entendre." Would anyone be able to tell solely from its title that *Hard Drive* is not a piece of equipment, not a porno flick, but a book by one David Pogue? ScruTiny in the Great Round is the name not of a software tool but of a work of the imagination. Since when has it been customary for works of art to have utilitarian, marketing-driven titles? What information is conveyed by such titles as *As You Like It*, *Moby-Dick*, or "Let It Be"?

My partner explains the meanings it has for her in a biographical video that our publisher, Calliope Media, went out of its way to include on the disc. It is intentionally a multiple entendre, referencing the womb, the passing of seasons, cycles of life and death, the eye, mandalas, and more, associations that become clearer the more time you spend with the disc.

JIM GASPERINI
*New York, New York*

## Another Year, Another Expo

WHAT ARE THE DATES OF THE Macworld Expo in San Francisco in January 1997?

GARY WEBB
*Bellevue, Washington*

*We just got back from the* last *Expo and you want us to think about the next one in '97?! Man. If you* must *think about it now, the 1997 Macworld Expo in San Francisco will run January 7 through 10. For more information, call Mitch Hall Associates at 617/361-8000.—Ed.*

## Mac or Windows or Both?

NO, THIS CAN'T BE RIGHT! DO I HAVE to buy an IBM? All I want to do is take a Director movie that I make on a Macintosh, make a projector out of it, and press it onto a CD for playback on both platforms. Do I really need an

*continues*

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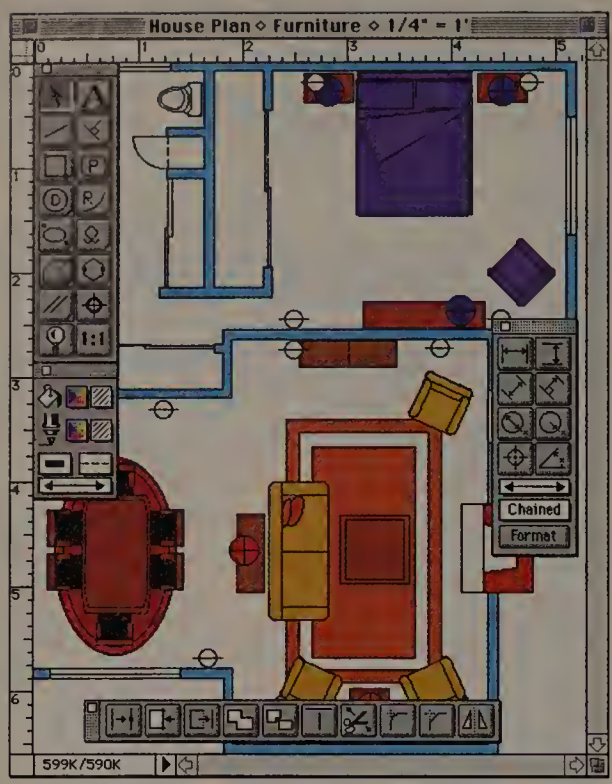


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IBM *and* a Macintosh version of Director? What about hybrid CDs?

I haven't purchased my new system yet. I was going to get a Mac, but if I need to buy two copies of Director and two different machines in order to produce cross-platform CD-ROMs, forget it. Is there anything I can do, or do I have to buy an IBM and forget about the Macintosh platform altogether?

*Well, you could always buy a Mac and forget altogether about the PC platform. . . .*

*Jim Heid,* Macworld*'s multimedia expert, responds: If you want to create Windows titles with Macromedia Director, you must indeed buy a Windows machine and the Windows version of Director. You can develop Windows titles using the Mac versions of Apple Media Tool and mTropolis's mFactory—but it's still a good idea to have a Windows machine on hand to test your project as it comes together.*

*As for just buying a Windows machine and forgetting about the Mac platform, that's certainly an option, although it's one that will cost you in sales. Macintosh owners are more likely to buy CD-ROMs than are people on the Windows side, where installation and compatibility hassles are common.*

## Multimedia Notes

IN YOUR RECENT ARTICLE ABOUT QuickDraw 3D ("The Mac's 3-D Edge," August 1996), you neglected to mention the QuickDraw 3D Web site at *http://quickdraw3d.apple.com*. This site lists scores of vendors that support QD3D and provides about 20 demo applications for QD3D. It also talks about future plans for Windows, integration with QuickTime, and the relationship to VRML 2.0, and even has a gallery of QD3D work for people to contribute to.

TONY DEYOUNG
*via the Internet*

I JUST READ JIM HEID'S ARTICLE ON multimedia applications ("Multimedia Options Multiply," August 1996) and was horrified to notice that you did not include HyperCard. HyperCard is *the* multimedia tool for me, not only for my shareware stuff but also for my daily teaching. Though HyperCard is in dire need of an update, it is still a competitor.

I'm not asking that you give HyperCard a glowing, this-is-the-greatest-program-ever review. Frankly, HyperCard doesn't currently deserve it. But it does deserve to be counted among its peers in your article about multimedia authoring software.

ERIC M. HOLSEN
*North Mankato, Minnesota*

## The Mac Isn't Fine without CAD

CHARLES SEITER INCORRECTLY CONcludes that "Mac CAD Does Fine without AutoCAD" (*News*, August 1996) by simply ignoring the mechanical CAD application and basing his conclusion on interviews with design firms that use the Mac for CAD. The reality is that large architectural firms are standardizing on Windows 95 and NT operating systems. Lack of the latest AutoCAD version on the Mac only serves as further justification for their OS strategy.

Apple and the Macintosh CAD developer community deserve to compete on a level field when it comes to selecting a platform. When the leading CAD product is not available, Mac faces an uphill battle. There is certainly need for concern.

NEIL KLEINMAN
*Tarzana, California*

## Reminds Me of Paul Simon

I READ YOUR REVIEW OF THE KODAK Digital Science DC50 Zoom Camera (*Reviews*, July 1996), and I would like to know: Is that *really* a white alligator? Where is it? What's the person in the background doing?

TIM BOGAR
*Lansing, Michigan*

*The photo is from the Denver Zoo, but Antoine Le Blanc is currently vacationing at the San Francisco Zoo before he heads home to New Orleans. We think he likes the foggy summertime weather.—Ed.* m

Letters should be sent to *Letters*, Macworld, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (*70370,702*), MCI Mail (*294-8078*), America Online (keyword *Macworld*), AppleLink (*Macworld1*), or via the Internet (*letters@macworld.com*). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*.

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Mark Hall
Editor in Chief
Macweek
July 24, 1995

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Director of Computing
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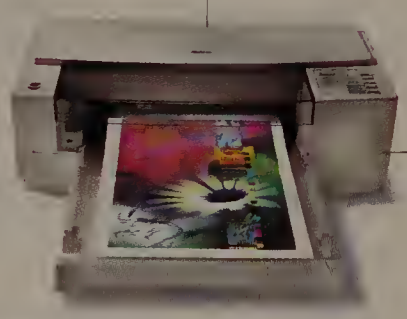

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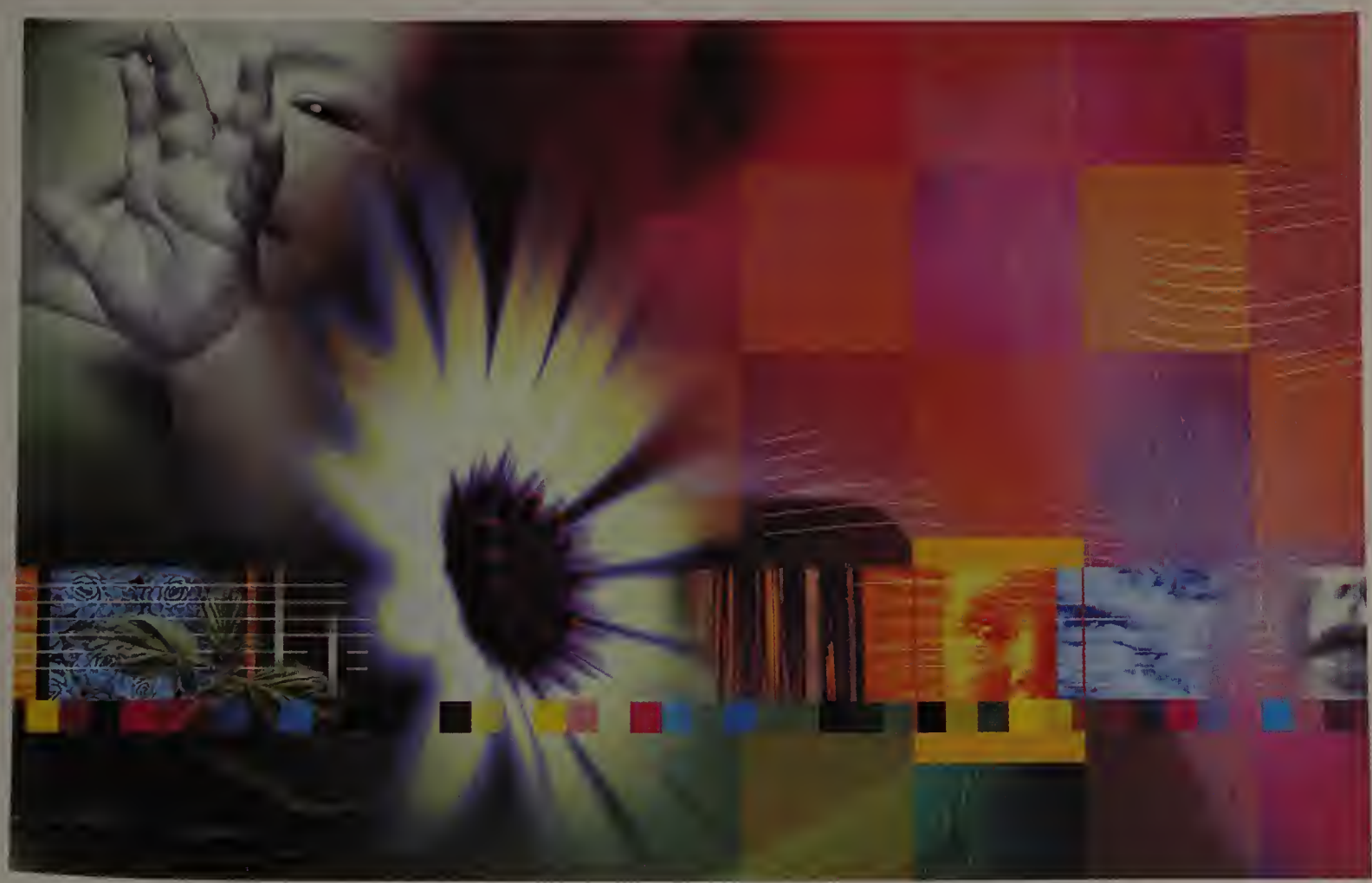

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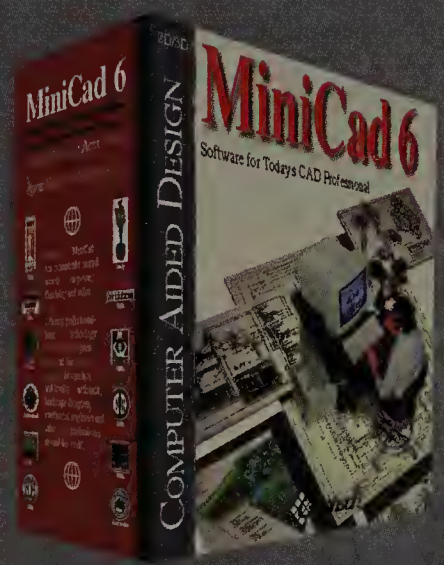


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**Circle 46 on reader service card**

# State of the Mac

by Adrian Mello

## New Road Ahead for the Macintosh

RECENT DEVELOPMENTS ARE CHANGING THE MAC LANDSCAPE

THE MAC MARKET HAS been pretty sleepy since the Worldwide Developers Conference in early May. No major announcements from Apple other than continued changes in the executive team and the absence of PowerBooks; no major product announcements outside of Apple, either. The entire Mac world has seemed to be in sleep mode.

Suddenly, though, things are getting interesting. Events have occurred that will permanently change the Mac landscape and lead to significant new product developments. As I see it, these events fall into a few important areas: computers, system software, and media and graphics. This overview will help put them into context. When you're ready for more, dive into this month's special report, "OS Essentials."

### The Bit-by-Bit OS

The biggest development is Apple's system-software upgrade schedule. Apple will no longer provide a single major release of its operating system, but will instead offer a series of updates every six months. What used to be code names for full-integer system releases—Copland and Gershwin—now refer only to collections of the technology well Apple will draw upon to incrementally release new system functionality (see "Mac OS 8: Back to Square One," this issue).

According to Ellen Hancock, Apple's new vice president of research and development, chief technology officer, and the principal architect of the new policy, Apple is considering a subscription pricing scheme. We may have to buy system releases incorporating major new features, though not releases for collections of bug-fixes and minor enhancements.

Hancock acknowledged that Apple must keep its developers apprised so that they can make product and marketing plans that take advantage of advances in the Mac OS. And Hancock says she's committed to Apple's doing just that.

While Apple has a new course for the Mac OS, OpenDoc is picking up steam. At Macworld Expo, Apple introduced version 1.1 of its component technology, and 16 companies introduced new OpenDoc parts—now called Live Objects—and containers (still called containers). Apple will make sure OpenDoc works with both Windows and Java so developers will be more likely to support it (see "OS Essentials: OpenDoc Finally Gets Tangible," this issue).

The good news is that you can use a variety of parts and get a real feel for the technology. See what it's like to add features to the application without the memory and storage overhead you've come to expect from monolithic applications like Word 6. It's also good news to a new class of developers who have interesting ideas for adding value to existing applications.

HANK OSUNA

### Blazingly Fast Computers

A slew of new computers were announced at and around Macworld Expo—not just from Apple, but clones as well. The biggest trend is speed. Faster PowerPC chips are enabling computer makers to ratchet up performance significantly.

The brightest lightning flashes came from Power Computing's new high-speed PowerTower Pro series in 180MHz, 200MHz, and 225MHz versions. With real lightning, if you count the seconds to the thunderclap, you can predict how far away the storm is. In Power's case, count on a few miles: the higher-speed 200MHz and 225MHz versions aren't available yet (see "Systems Watch," *News*, this issue).

Apple has bumped up the speed of several of its models. You can now buy a 200MHz version of the 9500 as well as a version with two 180MHz processors. This first dual-processor Mac uses DayStar's nPower 360+ card; the card will also be available for other Apple, Power Computing, and Umax SuperMac models.

IBM, Motorola, and Apple announced plans for faster versions of the PowerPC microprocessor code-named the G3 and G4 series. The current 603e and 604e will eventually attain speeds above 300MHz. The G3's, available in 1997, will be even faster. The G4's, planned for 1998, will be faster yet, clocking speeds up to 500MHz (see "Blindingly Fast Chips," *News*, this issue).

### News for the Value-Conscious

Several computers were announced that offer more performance at a better price. Apple's new Performa 6400 is faster than most previous Power Macs, and starts around $2400 (see *Reviews*, this issue). Power Computing's PowerBase series is based on the fast 603e PowerPC chip and should be available as you read this for roughly $1500 to $2200. Umax's con-

*continues*

sumer-oriented line, based on the 603e, is due in early fall for less than $2000.

Still dealing with PowerBook 5300 shortages, Apple plans to discontinue the 5300c. But its new notebooks, codenamed Epic and Hooper, are rumored to be on track. Power Computing intends to produce notebooks, but we'll have to wait until early next year for specifics.

Motorola is also entering the fray. In a *Macworld* exclusive, we test the new Motorola StarMax system, which provides excellent performance at what promises to be an excellent price (see "Motorola's Hot New Macs," this issue.) The Tanzania motherboard provides improved performance and an interim transition to the Common Hardware Reference Platform (CHRP). As CHRP becomes a reality, we should have even more choices. IBM and Motorola both demonstrated CHRP systems at Macworld Expo, and Apple expects to have a version of the Mac OS ready for CHRP.

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### 3-D and Real Time

There has been a flurry of activity in the graphics and media areas worth noting. Macworld Expo attendees saw new versions of Deneba Canvas and CorelDraw; Seybold visitors saw new versions of Macromedia FreeHand and Adobe Photoshop, PageMaker, and Persuasion, to name a few (see *News*, in this issue, for details). There was equally big 3-D and multimedia news. Let's start with 3-D.

Apple's decision to go directly to QuickDraw 3D version 1.5 (it should be available in late September) will no doubt please 3-D artists. QD3D 1.5 will be faster, will support painting on 3-D objects, and is also being optimized for the new multiprocessing systems. For those high-end folks, version 1.5 will permit them to plug in their choice of renderers.

Graphics applications are gaining speed and ease of use, if Fractal Detailer is an indicator. Users can render 3-D objects by painting on them as easily as they paint in two dimensions (see "Workstation Graphics on the Desktop," *News*, this issue). New, speedier versions of Specular's Infini-D and Strata Studio Pro also offer improved rendering and professional features.

On the media front, Apple now includes QuickDraw 3D as part of its QuickTime Media Layer (QTML), along with QuickTime VR, QuickTime Conferencing, and QuickTime 2.5. QuickTime 2.5 supports multiprocessing and placing QD3D objects in QuickTime movies (see "OS Essentials: QuickTime Becomes a Media Layer"). Apple looks serious about pushing QuickTime as a cross-platform standard, which in the long run could provide more leverage for Apple and the Mac, and that's good news for all Macintosh users.

### No Time Like the Present

Other developments in recent weeks also change the Mac's direction. Internet products such as Claris Home Page and the new version of PageMill continue to appear. The fundamental networking architecture supporting the Mac's growth on the Net is also changing (see "OS Essentials: Open Transport," and other Internet-related stories in *News*, this issue). To follow the changes, read *Macworld* and log in regularly to the Macworld Daily News on our Web site at *http://www.macworld.com*. As the saying goes, "May you live in interesting times." Like now. m

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Color calibrating? Three clicks, all done.
Traps and overprints? They all showed up.
Revisions? OK, so I'm a little obsessive.
The comp? It actually matches the screen.

5:00 PM What's next? I'm out of here.

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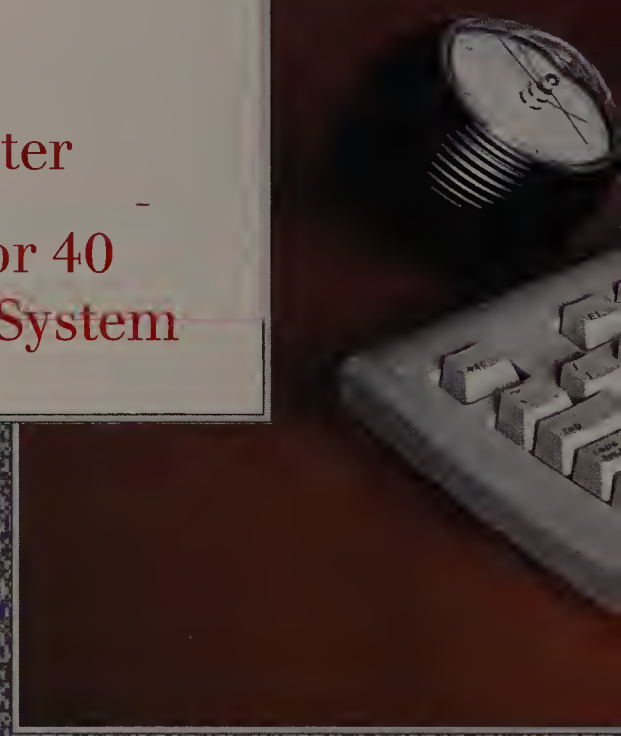

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# News

systems

## CHRP Moves Closer to Reality

APPLE, MOTOROLA, AND IBM SHOW OFF PROTOTYPE SYSTEMS

by Galen Gruman

RICHARD DOWNS

Long promised but now closer to reality: at the recent Macworld Expo, IBM and Motorola demonstrated their respective systems to run both the Mac OS and Windows NT. And Apple demonstrated a working prototype of a Common Hardware Reference Platform (CHRP) system that ran the Macintosh OS and included PC-style parallel, serial, and infrared ports running, respectively, a standard PC parallel printer, a PS/2 serial mouse, and an infrared serial keyboard.

**One System, Two OSs** Motorola displayed its Viper motherboard, which it will use in forthcoming CHRP Mac and Windows NT systems and sell to other systems makers. Viper has ADB, PS/2 serial, EIDE, and SCSI-2 ports, so it can handle both Mac and PC peripherals. IBM showed off its similar Long Trail motherboard.

IBM and Motorola both demonstrated how their CHRP motherboards let users switch between the Macintosh OS and Windows NT. When you start up (or restart), you get a screen with buttons for Windows NT and the Mac OS; the screen and its buttons are part of the Open Firmware ROM that the CHRP specification uses.

Both companies touted the new release of Windows NT 4.0 for PowerPC, which they demonstrated running Microsoft Excel. Then they rebooted their CHRP systems to run Fractal Design Painter under the Mac OS.

**Apple's Mac Focus** Apple's prototype system, code-named Opus, is not a dual-boot system; instead, it is a Mac-specific system based on CHRP. Apple's engineering manager for CHRP, Mike Bell, said that today's Mac programs would run unmodified on a CHRP-based Mac. To prove it he ran ClarisWorks 4.0, loading the communications component, and demonstrated that the communications dialog box shows two new ports—the PC's standard COM1 and COM2—in addition to the Mac's standard Modem Port and Printer Port.

Bell said the January update to System 7.5, code-named Harmony, should run fine on CHRP Macs as well, since the changes to support

continues on page 42

printing

# Brave New Driver

LASERWRITER 8.4 OFFERS A NEW INTERFACE, ONE-PASS PRINTING

by Anita Epler

Users of LaserWriter 8.4 will immediately notice a dramatic new look in Apple's (408/996-1010, *http://www.info.apple.com*) latest printer driver. But its enhancements are more than simply cosmetic.

When LaserWriter 8.0 debuted, it didn't take long for Apple customers to cry foul over the so-called innovation of two-pass background printing. Unlike older versions of Apple's printer driver, LaserWriter 8.0 first spooled print jobs to your hard drive, then streamed the data to the printer as a second step. This reduced the time required to return control to the application, but you needed twice the hard drive space to spool files in this fashion. In environments where file sizes are measured in hundreds of megabytes, such as service bureaus, this was no small sacrifice. Most shops opted to turn background printing off to avoid the disk crunch.

LaserWriter 8.4's biggest news is the elimination of this two-pass method. In addition, nearly all of the driver has been converted to PowerPC-native code. But you probably won't see major improvements in overall speed, despite predictions of Apple engineers at May's Worldwide Developer Conference, who promised performance boosts of 25 to 35 percent over previous versions.

Apple's claims are now more modest. "We've seen that [LaserWriter 8.4] provides different results based on different test suites," says Ken Feehan, Apple's product line manager for laser printers. "The more complex a document is, the more likely people are to see the benefits of native code."

The new driver also features an enhanced user interface that allows you to switch between like devices (for example, from one monochrome laser to another) within the dialog box, without having to cancel your print job and go to the Chooser. Other improvements include the ability to set layout options (such as 2-up or 4-up printing) within the Print dialog, and the relocation of printer- and application-specific options to their own screens, accessible via a drop-down menu in the Print dialog's main window.

LaserWriter 8.4 also requires that you adopt Apple's new desktop-printer scheme for managing output devices; the old PrintMonitor is gone. However, thanks to LaserWriter 8.4's companion software, Desktop Printing 2.0, desktop printers can now reside in any folder, not just on the desktop.

LaserWriter 8.4, currently shipping only with the LaserWriter 12/640 PS (see *Reviews*, October 1996), is available for download from Apple (*http://www.info.apple.com/swupdates/*).

Feehan won't comment on when the new driver will be available for mass distribution, but says it will likely be sometime in the fall.

graphics

# Workstation Graphics on the Desktop

NEW MAC APPLICATIONS EMERGE AT SIGGRAPH

by Cathy Abes

This year's Siggraph conference in New Orleans was dominated by the usual developers of Silicon Graphics products, along with Microsoft pushing Windows

NT as *the* high-end graphics platform. Still, a number of Macintosh products were shown, ranging from 3-D modeling, rendering, and animation to video painting and compositing to virtual reality applications.

**Powerful Rendering and Animation** LightWave 3D 5.0, from NewTek (913/228-8000, *http://www.newtek.com*), is finally coming to the Power Mac. The $1495 package, slated for October release, offers broadcast-quality modeling, rendering, and animation capabilities and will support QuickDraw 3D for viewing changes to graphic objects in real time. Macintosh users will have access to such professional-level features as full ray tracing, depth of field, motion blur, and variable lens settings. Other new features include MetaNURBS, which allows real-time transformations between polygons and splines to create organic 3-D objects, and MetaBalls, which uses spheres to approximate complex shapes and transform the rough shapes into complex 3-D objects.

Also migrating from Silicon Graphics workstations—and supporting QuickDraw 3D—is Vertigo 3D, from Vertigo Technology (604/684-2113, *http://www.vertigo3D.com*). Designed to ease the transition from 2-D to 3-D graphics, Vertigo incorporates Pixar's RenderMan renderer. Through its use of the QuickDraw 3D plug-in rendering architecture, it will also support other rendering packages such as LightWorks (see below). Fea-

*continues*

## Alps Joins Scanner, Printer

SMEAR-PROOF PRINTS AND METALLIC INKS

ARNOLD TIOSEJO

**Alps Electric (408/432-6000, *http://www.alpsusa.com*) is planning to release the $699 MD-4000 Color Printer/Scanner. The "MD" in MD-4000 stands for Micro Dry inks, which promise printing that is sun- and waterproof on any kind of paper. The inks come in metallic gold and silver, as well as the usual blue, red, yellow, and black. The MD-4000 also functions as a 24-bit scanner and handles images up to 8 by 11 inches.**

**The 600-dpi QuickDraw printer was expected to ship by the end of October. A model without a scanner, the MD-2010, should already be available for $499.—SUZANNE COURTEAU**

DOUG ROSS

tures include Phong-shaded previews, deformation lattices, effectors (plug-ins that generate effects such as waves, wind, and noise), hierarchical keyframing, and animatable shaders. You can drag and drop objects into a scene, change an object's contours by dragging any control point, and even drag shaders onto objects. Vertigo's Orbit window lets you move or rotate an object by moving the cursor around the window. For $800, you get a Mac-based program that can exchange data with—and has all the functionality of—its $5000 Silicon Graphics sibling, while the company promises the next Mac version will have more. Future features will include capabilities such as moving text along a path, rotating text, changing letterspacing, and mapping text around an ellipse.

LightWorks, from LightWork Design (44 114 266 8404, *http://www.lightwork.com*), is a photo-realistic renderer tool kit that's currently available only to other developers of 3-D software.

However, the company is working with Apple to package LightWorks as a plug-in renderer for QuickDraw 3D 1.5 (a release date is still to be determined).

**Video and 3-D Painting** Illuminaire, from Denim Software (310/618-9700), is actually two programs, Illuminaire Paint and Illuminaire Composition, that can be bought separately ($795 each) or together ($1395). The former, an object-based painting application, provides more than 30 draw modes, including smooth, blur, emboss, dodge/burn, tint, and posterize. You can change the order in which paint strokes and filters are applied to produce different results. Illuminaire Composition offers 3-D compositing of film clips and still images. Both packages support Adobe Photoshop and After Effects plug-ins.

Version 1.5 of MeshPaint 3D, from Positron (402/365-1002, *http://www.3dgraphics.com*), allows animators to create texture maps by painting directly on 3-D surfaces. New features in the $600 package include VRML support, a clone tool, and a Chroma-Stripper mode for removing color as you paint. VRCreator, from VReam (312/477-0425, *http://www.vream.com*), is a virtual reality authoring tool that supports VRML and Java to let you create interactive virtual worlds on the Web.

For accelerated rendering, GreenICE, from ICE (617/768-2300, *http://www.iced.com*), combines a Mac with an ICE 16-processor rendering engine. The product's pricing begins at less than $15,000; the system is due by year's end.

The Thunder 3D graphics card, from Radius (408/541-6100, *http://www.radius.com*), is designed to accelerate QuickDraw 3D applications and increase frame-rate performance; it supports enhanced resolutions and a 30-bit color palette. Prices begin at $4499.

## ISDN for PowerBooks

SCII OFFERS PCMCIA CARD

**If you're on the road and a 28.8-Kbps modem doesn't cut it for your file-transmission needs, consider ExpresSO PCMCIA, a $495 ISDN card from SCii Telecom (813/562-5971, *http://www.sciitelecom.com*) that works with Apple Computer's PowerBook. The card supports ISDN Basic access, consisting of two B channels at 64 Kbps plus a D channel at 16 Kbps. Mac PPP and TCP drivers are included. Of course, you'll also need an ISDN connection from the local telephone company.**

KEVIN CANDLAND

**—STEPHEN BEALE**

graphics

# Is There Life after JPEG?

VENDORS PROMOTE WAVELET COMPRESSION AS NEW STANDARD

**by Stephen Beale**

JPEG has always been an imperfect solution for compressing still color images. Established as an accredited industry standard by the International Standards Organization (ISO), JPEG uses a lossy compression algorithm in which small amounts of data are thrown away as part of the compression process. The more you compress the image, the more data gets thrown out, eventually resulting in artifacts and lost detail. Nevertheless, JPEG has become the dominant format for still-image compression. It's built into QuickTime and Adobe Photoshop, and is a popular format for displaying images on the Web.

Several vendors are now

MW LAB

## Umax Pulls Ahead of Power Computing

Armed with the latest and fastest PowerPC 604e 250MHz CPU, the prototype Umax SuperMac S900 604/250 was able to outrun a 225MHz Power Computing PowerTower Pro despite having a smaller cache (512K versus 1MB). However, the 225MHz version of the SuperMac S900 was slower than the 225MHz PowerTower Pro. Expect to see 250MHz 604e-based systems from Power Computing and DayStar this fall. For details on our tests, see "The New Speed Champs," July 1996.—**Macworld Lab testing supervised by Mark Hurlow**

**Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed in decreasing order of overall performance.**

| | Overall Score | CPU-Intensive | FPU-Intensive | Disk-Intensive |
|---|---|---|---|---|
| Umax SuperMac S900 604/250* | 9.6 | 9.6 | 14.3 | 3.5 |
| Power Computing PowerTower Pro 225 | 9.2 | 9.4 | 13.4 | 3.5 |
| Umax SuperMac S900 604/225* | 8.8 | 8.9 | 12.8 | 3.4 |
| Power Computing PowerTower Pro 200 | 8.5 | 8.4 | 12.7 | 3.5 |
| Umax SuperMac S900 604/200 | 8.3 | 8.5 | 12.0 | 3.0 |
| Apple Power Macintosh 9500/200 | 7.7 | 7.5 | 12.1 | 2.9 |
| Apple Power Macintosh 8500/180 | 6.7 | 6.6 | 10.3 | 2.4 |
| | Indicates typical performance in a mixed-use environment, such as a company or school. | Indicates performance for most business and personal tasks. | Indicates performance for analytical, 3-D, and other specialized uses. | Indicates performance of the Mac's data-transfer capability, which affects all users. |

*Prototype system.

promoting alternative compression schemes as potential replacements for the discrete cosine transform (DCT) technology currently used in JPEG. Most are based on a technology known as wavelet scalar quantization (WSQ), originally developed at Los Alamos National Laboratory

for the FBI as a method of storing and transmitting fingerprint data.

Like DCT, WSQ is a lossy technique, but there's generally less of a trade-off between the compression ratio and image detail. Wavelet vendors say you can squeeze the picture about twice as much as with JPEG to get the same level of quality.

Two companies offering Mac-based wavelet-compression products are LizardTech (206/728-8120, *http://www.lizardtech.com*) and Aware (617/276-4000, *http://www.aware.com*). Both vendors have connections to the original WSQ development effort: Aware's technology is a direct implementation of the FBI fingerprint standard, while LizardTech's software was written by the same programmers who created the original WSQ algorithms.

LizardTech plans to offer wavelet compression through a product called MrSID, which is primarily targeted at the geographic information systems market. The company claims that you can compress a color image at ratios up to 100:1 with no discernible loss of quality. The software has three components: a compiler-compressor, a distributed image-database server, and a viewer-decompressor. A Netscape plug-in version of the viewer is currently available free from the LizardTech Web site, which also includes sample compressed images. Pricing for MrSID itself has not been announced.

Aware's technology is implemented in the form of AccuPress, a $395 Photoshop plug-in that was introduced last February. You can compress the image at any ratio between 4:1 and 150:1 using Photoshop's Save As function. The package also includes a viewer that allows you to read AccuPress images. Like LizardTech, Aware plans to offer a free version of the viewer as a Netscape plug-in.

The primary obstacle to acceptance of wavelet compression is a lack of standards: images compressed with one vendor's product cannot be decompressed with software from competing companies.

None of the wavelet vendors is big enough to establish its technology as a de facto standard, leaving them with two choices: get a major vendor like Apple or Adobe Systems to endorse their format, or get a standard-setting body such as the ISO to establish wavelets as an accredited industry standard.

Greg Gilley, director of engineering for imaging and video for Adobe, says that any WSQ implementation would have to be in the public domain—if not actually accredited—for Adobe to adopt it. There would also have to be widely available tools for working with the format. However, he sees WSQ as the most likely successor to JPEG, and expects the technology will be adopted more widely in the next year or so.

DOUG ROSS

## Sneak PEEK

### FreeHand 7 Leapfrogs Illustrator

BY SANDEE COHEN

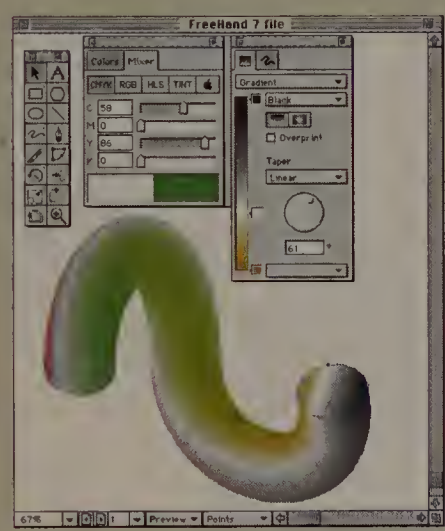
Just one year after FreeHand 5.5 debuted, Macromedia (415/252-2000, *http://www.macromedia.com*) is about to release a major upgrade. But in keeping with its aggressive strategy, the company has decided to skip over 6 and go directly to version 7. It's hard to say who will be more impressed, FreeHand or Adobe Illustrator users.

One advantage Illustrator has always had over FreeHand is its synergy with Adobe Photoshop. But with FreeHand 7, Macromedia has eliminated this issue. Drag and drop works seamlessly in both directions, and you can paste FreeHand objects into Photoshop as pixels or paths.

You'll find a few new Illustrator-like Xtras such as Roughen, Bend (like Punk and Bloat), and Envelope (like Free Distort), as well as a chart tool to make basic charts and graphs. Unlike with Illustrator, this chart tool has an Apply button that makes it much easier to see how each setting changes the chart's look.

Any Illustrator user who has found FreeHand's control handles clunky will appreciate the new setting for smaller handles that look almost identical to Illustrator's. And like Illustrator, FreeHand 7 can color the handles for each layer, making it much easier to select and modify objects.

But don't get the idea that FreeHand 7 is just playing catch-up with Illustrator. It has leaped way ahead by allowing blends between spot colors and between objects filled with gradients. It also lets you take two blended objects and join them to a path. This, combined with FreeHand's live blends—the ability to modify a blend on screen by adjusting the original objects—gives FreeHand the most powerful set of blend tools anywhere.




FreeHand 7 can combine blends on a path.

In addition to wooing Illustrator users, the new version will be a boon for FreeHand users. For example, instead of 26 variations of the Inspector Palette, there are now 5 tabbed palettes that can be merged like those in Photoshop or docked so they move together. FreeHand has always had sophisticated object and text styles, but version 7's new Graphic Search and Replace goes further. You can search for object attributes—such as colors, stroke widths, even object shapes—and replace them with new attributes. Illustrator's Select filters don't even come close.

In spite of these significant enhancements, the jump in version number from 5.5 to 7 seems a little steep. Is Macromedia playing a numbers game with Adobe? It will be interesting to see how Adobe responds with the next version of Illustrator.

Special REPORT

# Adobe Rebuilds Graphics Powerhouses

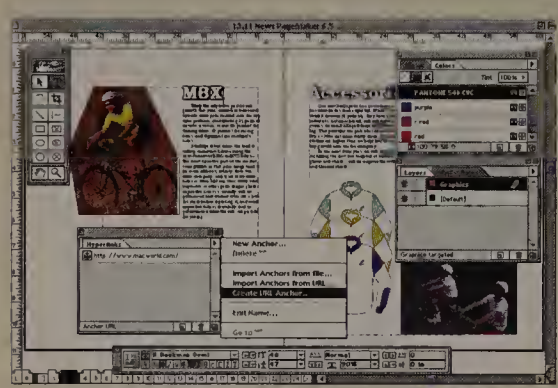
UNVEILS MAKEOVERS FOR PAGEMAKER, PHOTOSHOP, AND PERSUASION

The latest versions of Photoshop, PageMaker, and Persuasion feature new interfaces and offer enhanced Internet publishing features. But will they help Adobe maintain its dominant position in the Mac graphics market? *Macworld* answers the question in this special report.

## PageMaker 6.5 Goes for the Jugular

by Galen Gruman

Just a year ago, Adobe Systems (206/622-5500, *http://www.adobe.com*) brought us PageMaker 6.0, boasting of color-management and master-page features meant to attack QuarkXPress on its own turf. Now Adobe has turned up the heat, adopting a key QuarkXPress layout approach—the use of boxes to hold text and graphics for structure layouts (you can still use the original PageMaker column-by-column placement approach). It is also staking a claim on Internet publishing by adding a raft of Web-oriented features to PageMaker 6.5, which is due to ship in November for $895. Upgrades will cost just $99. (Quark hasn't revised the Mac market leader XPress since 1993, although version 4.0 is expected next spring.)



PageMaker 6.5 adds new Web-publishing capabilities, as well as interface refinements to better match the look and feel of Photoshop 3.0.

### Boxes Arrive

The adoption of boxes to hold elements marks the end of a ten-year resistance to this idea, which has been a hallmark of all other leading page layouts through the decade. I find this technique to be much more flexible than PageMaker's traditional approach, especially when modifying a design. And I'm happy to see Adobe outbox the competition: rather than have separate types of boxes for text and pictures, PageMaker has simply one box in which you can place anything. However, Adobe is missing a key rationale for boxes: multi-column text. PageMaker 6.5's boxes contain only one column, so you can't use them easily to convert a layout from, say, two to three columns.

Adobe continues its relentless campaign to make all its programs—most, like PageMaker, acquired from other companies—share similar approaches and interfaces. That means PageMaker gets the tabbed palettes of Photoshop 3.0 and the ability to have multiple layers on a page—the electronic equivalent of paper overlays.

The multiple layers allow PageMaker users to create documents that contain multiple versions—you might have a layer for text in different languages, for example, or separate layers for Web and print graphics. By selecting the layers for output, you create a version of the document for a specific medium or reader. This is the kind of feature whose power will not be obvious to you at first but over time will become a must-have.

### New Plug-in Scheme

Another significant interface change is in how plug-ins, formerly called Additions, are managed. Plug-ins are no longer confined to a menu list, so developers can now create them so they reside in any menu, dialog box, or palette—just as QuarkXPress's XTensions can. This means you'll be able to access added functionality where you'd expect to use it.

While competitor Quark has focused on creating an XPress add-on called Immedia to produce multimedia documents (see "Immedia Makes QuarkXPress Interactive," *News*, August 1996), Adobe has extended PageMaker to the Web. The previous version had rudimentary HTML export, but the new version really aims at the Web.

The HTML export now handles most HTML 3.2 features, including frames. And PageMaker now automatically converts graphics to JPEG and GIF formats when exporting for the Web. You can also create hyperlinks in your document, including those to URLs.

A year ago, I thought PageMaker 6.0 was a necessary but not awe-inspiring upgrade. This year, Adobe Systems is on its way to hitting a home run with PageMaker 6.5, if the final version delivers on the prototype's promise.

## Photoshop 4.0 Delivers New Interface

by Cathy Abes

Photoshop 4.0 is bound to stir controversy among veteran Photoshop users, since its redesigned interface will necessitate significant relearning. However, once you

*continues*

DOUG ROSS

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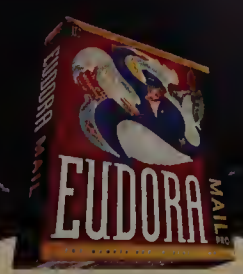


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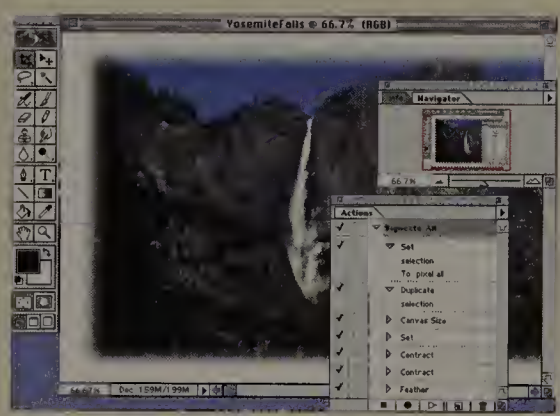
**Circle 22 on reader service card**

get used to the many reshuffled keyboard commands, such as those for Clone and Deselect, you can turn your attention to some major enhancements.

### New Palettes

Two new palettes add useful functions: the Navigator palette provides flexible zooming and panning, an improvement over 3.0's preset zoom levels, while the Actions palette offers task automation and batch processing—you can record your editing steps, reorder them, disable selected ones, and play them back on any number of files. User-definable guides and grids provide precision alignment. Another useful interface enhancement is control-drag, which pops up a menu of common operations related to whatever tool is selected.



Photoshop 4's new Navigator palette lets you zoom in on a large image, while the Actions palette permits task automation and batch processing.

Adobe's commitment to layers is evident in its addition of Live Picture–style adjustment layers, which act as masks through which filters and other effects can be applied to underlying image layers. Thus, an adjustment layer can be changed repeatedly without altering the image permanently. However, aficionados of floating selections may be disconcerted to find that such operations as applying a filter or adding text create a new layer rather than a floating selection.

### Improved Distortions

Transformations have also been enhanced. The new Free Transform command lets you apply multiple distortions—such as scale, skew, and rotate—to an image in one step, simplifying complex manipulations and reducing image degradation. And the ability to specify numeric transformations lets you edit images with more precision.

Users who prefer not to install a slew of third-party filters will be pleased with the 48 new effects filters that have been added to 4.0, including Adobe Gallery Effects. Another new feature is Imagemarc, software by Digimarc that embeds visually imperceptible watermarks throughout an image that are still readable even after the image is edited, printed, or rescanned. When you open a watermarked image in Photoshop, the program indicates the presence of copyright information and provides a link to the copyright owner's Web site.

### Web Format Support

Like every other application these days, Photoshop has added Web-related features. It supports Portable Network Graphics (PNG) and Progressive JPEG, and lets you save Acrobat PDF files. For those who are hungering for more speed, Photoshop supports symmetric multiprocessing on Macintoshes with multiple processors.

Expected to ship by November, Photoshop 4.0 will retail for $895. It will include an interactive tutorial, stock photos, sample plug-ins, a digital gallery, and demo versions of other Adobe software.

# Web Features Add Life to Persuasion

by Stephen Beale

Adobe Persuasion has long been among the leading programs for design and production of 35mm slide presentations. But as fewer people use 35mm slides, developers have transformed their packages into tools for on-screen presentations, adding what are essentially interactive multimedia functions. Now, given the industrywide push toward Internet publishing, it should be no surprise that Adobe has made the World Wide Web a focal point for Persuasion 4.0.

### Internet Retrofit

It's an alluring concept: take a self-running presentation and put it on the Web. Persuasion 4.0 offers several tools for doing so: import filters for GIF and JPEG, Web-page autotemplates, and the ability to drag and drop URLs from a Web browser to a slide. However, instead of generating HTML code for the Web page, Persuasion 4.0 produces an Acrobat PDF file using Acrobat Distiller. This less-than-ideal solution makes Persuasion's Web support look more like a retrofit than an integral part of the software.

### Improved Integration

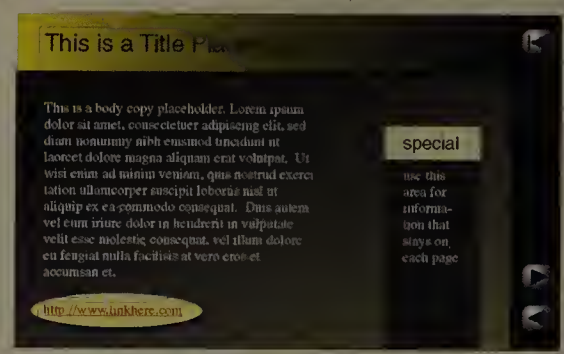
Other features in the $395 package follow Adobe's recent trend of better integrating its products. Palettes and keyboard shortcuts are now reminiscent of those in Photoshop and Illustrator; there's even a Layers palette similar to those in Adobe's other graphics packages. Photoshop and Illustrator files can be imported in native format, the former with layers intact.

To improve cross-platform compatibility, the Mac version of Persuasion includes several features previously available only under Windows: dashed and dotted lines, a cropping tool, and enhanced tab functions. There's also a conversion utility for Microsoft PowerPoint files.

### Managing Fonts and Links

A new font-management function displays all fonts used in a presentation and allows you to globally replace one font with another. The new Links Management dialog box shows the location and file size of all linked graphics, sounds, and movies. You can also use this dialog box to keep track of—and modify—hyperlinks.

Also new: variable-speed transition effects, an eyedropper tool similar to the one in Photoshop, and customizable autotemplates for multimedia presentations.




Persuasion now lets you convert self-running presentations into PDF files for use on the World Wide Web.

However, considering that 4.0 is the first major upgrade to Persuasion since Adobe's merger with Aldus, surprisingly little is new. In part, this is a sign of a mature—some might even say geriatric—software category.

It will be a long time before users lose their need for sophisticated business presentation tools. But if Persuasion 4.0 is any indication, improvements to the tools themselves will be incremental at best.

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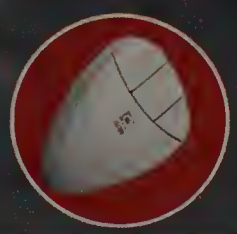

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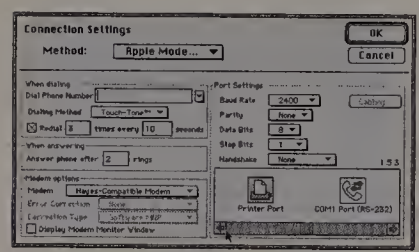
"CHRP MOVES CLOSER"
*continued from page 34*

CHRP hardware are concentrated in the Mac's Toolbox and thus should work in future System 7 versions.

This contradicts statements in early August by Mac OS product manager Vito Salvaggio that the CHRP OS might diverge from future System 7 versions. However, at that point, Apple was working on a more substantial System 7 revision under the Harmony rubric that is now scheduled for summer 1997. The delay may explain why Bell is confident that his team can keep the CHRP OS on par with the Mac-only OS.

**CHRP Timeline** At the conference, executives from Apple, IBM, and Motorola said CHRP systems should appear when the CHRP Mac OS is ready. George Scalise, Apple's chief administrative officer, said the final CHRP Mac OS should be ready in early 1997; the developer version is supposed to be ready in September.




Apple's prototype CHRP Mac runs PC devices and lets programs use them without modifications. The dialog box displays icons for the Mac Printer Port and the PC COM1 port.

Scalise countered rumors that Apple would not move its full system lineup to CHRP, but said it would take several years. He suggested that 1999 would be the first year that Apple had no more non-CHRP systems for sale; it took a similar period to phase out 680X0 Macs after the Power Macintosh was introduced.

systems

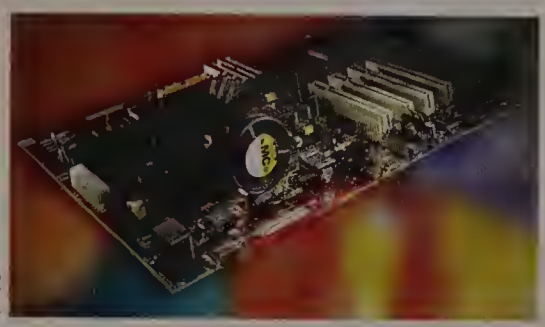
# IBM's Mac Quest

INTERNAL DIVISIONS HAMPER MOVEMENT TO MACINTOSH CLONES

by Galen Gruman

The IBM Microelectronics Division, which invented and coproduces the PowerPC CPU, would like to see Big Blue develop and sell IBM-branded Mac systems, says Jesse Parker, director of segment marketing at IBM Microelectronics. But the reason IBM can't commit to doing so is that the IBM PC Company—the division that makes and sells Intel-compatible PCs—has not agreed to make Macs, despite the Microelectronics Division's push to create a new Mac market based on the Common Hardware Reference Platform (CHRP) standard developed by IBM, Motorola, and Apple.

Parker did not discuss the details of the IBM PC Company's objections, but it's been clear for several months that the IBM systems division has opposed developing Mac systems for fear of turning attention away from the division's PC line. Last summer, a power struggle between the IBM PC Company and the now-defunct Power Personal Systems Division, which was to have made Macs for resale by other companies, led to the dissolution of the Power Personal Systems Division. The Microelectronics Division then rekindled the Mac flame this winter, using its leverage as a huge part of IBM—making up 10 percent of the company—to survive the initial political challenges.



GIBSON

IBM's Long Trail CHRP motherboard.

The Microelectronics Division also manufactures Intel-clone CPUs, including the 8X686 Pentium-class CPU, which is used in several PCs. The Microelectronics Division recently acquired a license from Apple to sell the Macintosh OS to any company that buys PowerPC CPUs, and the division has set up three training centers throughout the world to help would-be Mac-clone makers develop CHRP-based Macs. It would also help companies seeking to build CHRP systems running Windows NT.

systems

# Blindingly Fast Chips

NEW POWERPC WOULD RAISE CPU SPEEDS TO 500MHZ

by Charles Piller

Think today's Mac compatibles are fast? Be prepared to adjust your standards next year. In fact, you may not need to wait until next year—some Mac systems makers, such as DayStar Digital, expect to have 300MHz PowerPC 604e–based systems by the end of this year.

Just as Mac systems are beginning to demonstrate the PowerPC processor's long-promised superiority to Intel's Pentium, the PowerPC's designers have announced a sketch of the PowerPC's future into the new millennium.

**The G Series** IBM, Motorola, and Apple have announced two new chip series, code-named G3 and G4, that are designed to enhance the performance of the PowerPC dramatically, well into the next century.

The G3 series will extend the architecture of today's 603e, 604e, and 620 microprocessors by tuning the bus and software, adding a "backside" cache (a separate cache similar to that used by Intel's Pentium Pro CPU); and by shrinking the chips' die size from the current 0.5-to-0.25-micron range to 0.35 to 0.25, allowing an increase in the number of transistors per chip from a limit of 8 million today to as many as 30 million.

Motorola's PowerPC marketing manager, Will Swearingen, and his counterpart in IBM's Microelectronics Division, David Ryan, indicate that today's 603e and 604e desktop-CPU families (as well as the 620 server CPUs) will gradually be extended above 300MHz.

G3 CPUs, slated for release in 1997, will raise the stakes, starting at 200MHz and going higher than 400MHz, offering up to ten times the speed of the original PowerPC 601 CPU, according to Ryan.

**New Architecture** The G4 series, expected in 1998, will use a new architecture and a much smaller die size, 0.25 to 0.18 microns, allowing up to 50 million transistors per chip and speeds above 500MHz, according to IBM and Motorola. Despite the new architecture, the G4 will be fully backward-compatible with today's software programs, Ryan says.

The companies say that these new generations of chips
*continues*

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# Internet WATCH

BY KEITH A. MITCHELL

**Browser Wars** With the near-simultaneous release of Netscape Navigator 3.0 (415/528-2555, *http://www.netscape.com*) and Microsoft Internet Explorer 3.0 (206/882-8080, *http://www.microsoft.com*), both companies are tripping over each other to entice Web users to their products. Netscape had a Web traffic jam the day it released the downloadable Navigator 3.0, but Microsoft stole some thunder by offering free temporary subscriptions to popular online sites like the Wall Street Journal, ESPNET SportsZone, and MTV Online. Netscape countered with its own content freebies, including the New York Times, PC World Online, Netscape World, and Sony Music. Netscape also issued a point-by-point comparison of the two browsers, claiming that Navigator is 30 percent faster than Internet Explorer. At this point, Macintosh users don't have much choice: a Mac version of Internet Explorer 3.0 won't be available until later this year.

**More Than a Face-Lift** Users of America Online's (703/448-8700, *http://www.aol.com*) new client software, version 3.0, will notice much more than a new look—the new Mac client contains every feature found in its Windows sibling.

The AOL 3.0 Web browser—based on Microsoft Internet Explorer 2.1—supports frames, tables, background colors, and most multimedia formats. The new browser will also support Netscape plug-ins. Other improvements include drag-and-drop capability and a native version for Power Macs.

**Server on the Cheap** Would you like to maintain a Web server but can't afford to lease a T1 line? FireSite ($499 list price), the new WebStar plug-in from ClearWay Technologies (617/973-5001, *http://www.clearway.com*), may be the answer. Users can rent server space from an Internet service provider (ISP), pay for a low-speed connection, and use FireSite to get T1 results far more cheaply.

FireSite copies the slow-loading graphic elements of your Web site to the ISP's server, which is directly connected to a T1 or T3 linkup. So even though your HTML pages are served over your 28.8-Kbps line, the graphics come from the T1, dramatically improving speed. It's all transparent to the ISP and Webmasters. An $1199 multimedia edition accelerates downloads and supports Macromedia Shockwave and Apple QuickTime.

will show definitively that the PowerPC's RISC architecture can sustain ongoing performance improvements better than Intel's combination RISC and CISC processors do—a point disputed by Intel. The CPU wars continue, to the Mac's advantage.

systems

# BeOS on the Power Mac

NEW SOFTWARE OFFERS MULTITASKING, PROTECTED MEMORY

by Stephen Beale

The operating system offers preemptive multitasking, protected memory, and true virtual memory. Best of all, it runs on a Power Mac. Has Apple suddenly performed a miracle with an early release of Mac OS 8? No, it's the BeOS from Be Inc. (415/462-4100, *http://www.be.com*), the company launched in 1990 by former Apple executive Jean-Louis Gassée.

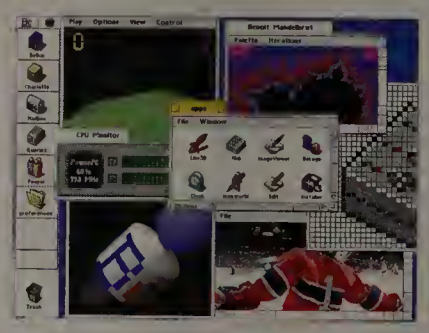
At the recent Macworld Expo in Boston, Be demonstrated a version of the BeOS running on a PowerPC-based Macintosh system from Power Computing. The OS was originally developed for the BeBox personal computer, but the company announced last year that it would port the software to other computers.

The Power Mac version of BeOS is the first fruit of this effort. It's a natural for the new operating system, because the BeBox also runs on a PowerPC processor.

**Not Ready for Prime Time** The Expo demonstration was just a technology preview, and the Macintosh version of the BeOS was not quite ready for prime time. As of early September, drivers for the floppy drive and Ethernet were not working. In addition, there's no easy way at present to share files between the Mac OS and BeOS.

But the BeOS itself appeared to run cleanly, and its preemptive-multitasking capabilities were evident as company representatives simultaneously played movies, MIDI files, and game applications. They also demonstrated protected-memory capabilities by deliberately crashing an application without bringing the system down.

**Third-Party Obstacles** At this point, Be's biggest obstacle is the lack of third-party BeOS applications. However, any programs that run on the BeBox should also run without modification on BeOs for Power Mac. On the other hand, Be marketing director Mark Gonzales says the OS requires minor tweaking to run on specific Power Mac models. However, he adds that it will be relatively easy to port the OS to systems based on the Common Hardware Reference Platform (CHRP).



The BeOS offers preemptive multitasking and protected-memory capabilities.

Gonzales expects BeOS for Power Mac to gain an early following among multimedia and digital-video producers. As third-party applications move to the BeOS, he also expects that some vendors will bundle the

continues

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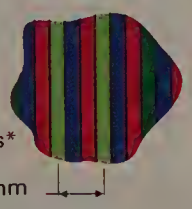

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OS with their applications.

Be plans to demonstrate a more complete implementation of the BeOS at the January 1997 Macworld Expo in San Francisco. The software is scheduled to ship in the first quarter of next year.

communications

# Timbuktu Pro Gets Personal

NEW VERSION ADDS DIAL-UP CONNECTIONS AND "CAMPING"

by Galen Gruman

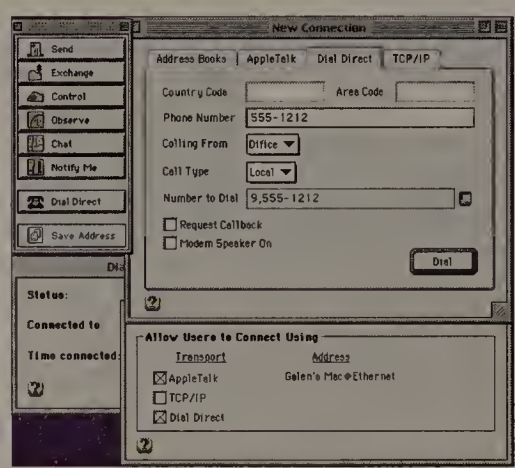
You may have passed by the last Timbuktu Pro revision, unless you happened to be using a Novell network. Aimed largely at corporate network administrators, version 2.0 simply wasn't compelling for many users. So Farallon Computing (510/814-5000, *http://www.farallon.com*) has tried again with version 3.0—and this time, you probably won't pass it by.

The new version, which began shipping in early September, adds two compelling features: the ability to dial up other Timbuktu users and form an instant network over the phone, and a free copy of Apple's ARA Personal Server. With direct dial-up integrated into Timbuktu, you no longer need the separate Timbuktu Remote program. And when you're connected to a colleague by modem, you can "talk" through a new chat window—handy if you don't each have two phone lines.

Another interesting addition is a Netscape plug-in. Web designers could give people access to portions of their network via this plug-in; Farallon expects it to be used mainly with intranets and secure Internet pages.

No matter how you're connected—over the phone, via ARA, over TCP/IP, via LocalTalk, or via NetWare IPX—you can use Timbuktu's new Notify option, which tells you when someone you're trying to reach over the network is available. Think of it as a phone's camp-on-line feature. Also handy for network use: guests can log on after getting your permission—this way you don't have to allow universal guest access or set up an individual's access privileges in advance.

Timbuktu Pro 3.0 costs $139 for one user, $189 for two users, and $679 for ten users; other high-volume licenses are available. If you have version 2.0, the upgrade is $20, plus another $10 to get ARA Personal Server; Timbuktu 1.0 or Timbuktu Remote users can get upgrades for $50.




When you dial into another Macintosh, Timbuktu Pro 3.0 allows you to share files or even control the machine.

# Systems WATCH

BY CHARLES PILLER

## Clone Vendors Delay Systems

Power Computing (512/388-6886, *http://www.powercc.com*) and Umax (510/226-6886, *http://www.supermac.com*), which have been heavily promoting their latest Mac clones, have fallen behind in their efforts to ship the machines. Power Computing in particular has adopted a strategy of gaining mind-share by aggressively marketing products it cannot initially ship in volumes close to the demand generated.

**PowerTower Delays** As of early September, Power Computing had shipped only a handful of its PowerTower Pro 200 and 225 units. The Power Computing sales force has told callers that units will be available no earlier than September 23. As of mid-August, the company was not even taking orders on 180MHz models, and a few weeks later callers were told not to expect the machines until early October. The company had similar delays on its 180MHz and 200MHz PowerTower models.

Mike Rosenfelt, Power Computing's marketing director, acknowledges that the company never expected to ship the 225MHz units in volume until late September, and that it usually takes 30 to 40 days to catch up to demand for a faster CPU. Power Computing has also yet to ship its consumer-level PowerBase models. It decided to add 3-D–graphics acceleration and thus was still doing engineering work on them as of early September.

Umax had similar delays with its consumer-oriented Macs, the C500 and C600 lines. By preannouncing faster hardware, both companies face the danger of dampening demand for earlier systems. And Umax faces another, possibly significant unintended consequence. Like Apple, Umax sells primarily through dealers. In addition to shrinking its revenues, preannouncements tend to alienate dealers. Power Computing, on the other hand, sells most of its machines by mail order, and thus does not have to worry about alienating dealers.

**Megahertz War** One executive involved in PowerPC development called the rapid rollout of faster and faster models "a megahertz war" that will confuse customers and inflate the unsold inventory of slower machines.

But industry analyst Pieter Hartsook believes that, on balance, raising the excitement level and generating renewed interest in the Mac is good for the market. He doubts that the purchases of slower machines will drop off much as a result of such tactics.

David Ryan, PowerPC marketing manager for IBM Microelectronics, believes that such rapid revisions based on increasingly speedy CPUs is an anomaly. In one quarter, 166MHz, 180MHz, 200MHz, and 225MHz versions of the 604e CPU were introduced. From now on, speed improvements will be phased in much more gradually.

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>
> *—Mac Home Journal, August 1996*

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**Circle 56 on reader service card**

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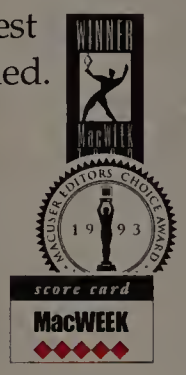

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**Circle 26 on reader service card**

# New Products

THE LATEST MACINTOSH RELEASES

## COMMUNICATIONS

### Messaging and Fast Fax

The $290 SupraSonic 336 V+ fax modem from Diamond Multimedia Systems (408/325-7000, *http://www.diamondmm.com*) includes voice messaging, automatic fax-voice discrimination, and remote access to messages. A headset included with the SupraSonic modem allows hands-free phone operation, message recording, and playback.

### LAN-Modem PC Card

The EtherMac, from Farallon Computing (510/814-5100, *http://www.farallon.com*), provides 28.8-Kbps data-transmission and 14.4-Kbps fax-transmission speeds and works with both PowerBooks and PC notebooks. And because it combines Ethernet and modem capabilities on a single card, the EtherMac leaves the second slot open for another PC Card. Included with the EtherMac is Farallon's Timbuktu Pro 2.0.

## DISPLAYS

### Micro Conversions Adapter

Micro Conversions (817/468-9922) has announced a new graphics card that supports resolutions of up to 832 by 624 pixels in 32-bit mode and up to 1280 by 1024 pixels in 8-bit mode (it works in 8-, 16-, and 32-bit modes; on a Mac, 32-bit mode is the same as 24-bit mode). The VP2MPCI card comes with connectors for both Macintosh and VGA monitors. These connectors also offer the flexibility to mirror monitors for presentations. The 2MB, 32-bit VP2MPCI sells for $249. Micro Conversions also announced that it is dropping the prices on the NuBus 2124NB II and PDS 1724PD cards, which now sell for $399 and $299, respectively.

## GRAPHICS

### Clip Art for Every Occasion

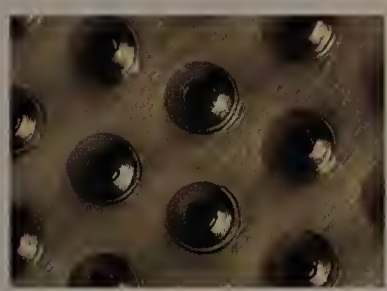
If one picture's worth a thousand words, the clip art world just got a lot more verbose.

• The $149 Ornamental Backgrounds CD from Aridi Computer Graphics (214/404-9171, *http://www.aridi.com*) provides 202 editable vector images designed for creating seamlessly tiled backgrounds and textures.

• Letraset's (201/845-6100, *http://www.letraset.com*) Phototone Photo CD Series: Paper & Textiles, Abstracts, Earth Textures, Horizons, and Aged Materials features five $199 volumes, each containing 85 royalty-free images in Kodak's Photo CD format.

• The new MapArt Cities/Metro series, from Cartesia Software (609/397-1611, *http://www.mapart.com*), offers editable maps of metropolitan areas and city centers ($125 each) for Atlanta, Boston, San Diego, and San Francisco. The $99 MapArt U.S. Stock Images provides high-resolution JPEG and low-resolution GIF versions of world, country, regional, and U.S. state maps. A third collection, MapArt U.S. Terrain ($529), provides U.S. state and county maps.

• The Metals Collection, from Digital Textures (815/637-6139), is a set of 25 high-resolution metal images photographed on 8-by-10-inch film. The two-CD set costs $149 plus $7 for overnight shipping.



*The Metals Collection*

• PhotoDisc (800/528-3472, *http://www.photodisc.com*) can help add the human touch with its $299 PhotoDisc Volume 35: Business Today. This CD offers original photos of people in real work settings from around the world, plus photos of staplers, envelopes, and other standard business objects. The CD's 336 images come in 10MB files.

### Live Picture in Overdrive

Live Picture Overdrive, from Live Picture (408/464-4200, *http://www.livepicture.com*), is not a souped-up version of the company's image-editing software. Instead, the $195 package includes the core features of Live Picture without many of its bells and whistles. Like its sibling, Live Picture Overdrive allows you to edit and composite large images with minimal speed penalties. Registered users get a free version of Fastedit/IVUE, an Adobe Photoshop plug-in that allows you to open selected portions of Live Picture IVUE files for editing in Photoshop.

*Live Picture Overdrive*

## MULTIMEDIA

### Plug-and-Play Video

Digital-video systems offer video professionals more power and flexibility than ever before. Several new hardware and software products are filling out a growing field.

• Minerva Systems (408/970-1780, *http://www.minervasys.com*) has combined its desktop MPEG video-publishing system, Minerva Publisher, with emotion's (415/812-9000, *http://www.emotion.com*) content-distribution and content-reviewing software, CreativePartner, to create Minerva VideoShare. The new product lets you quickly and easily view, annotate, send, archive, and retrieve MPEG digital-video files via existing LANs and WANs. A ten-user package retails for $25,000.

• Bravado 1000, from Truevision (408/562-4200, *http://www.truevision.com*), is a QuickTime-native video-capture, -editing, and -playback system that provides professional-level video output for about $1000. The Bravado 1000 captures and outputs full-screen, full-motion video and supports composite-video and S-Video input and output for both PAL and NTSC. It's compatible with a wide range of QuickTime-based applications such as animation, modeling, image-editing, and illustration packages.

• Boris Effects 2.0, from Artel Software (617/566-0870, *http://www.tiac.net/users/artel*), is an upgrade to the digital video effects plug-in for Media 100 and Adobe Premiere that offers unlimited effects tracks, video cubes, soft borders and shadows, motion path controls, and specular lights. Also included is a library of more than 100 effects. The upgrade is $99 for the Media 100 version, $49 for the Premiere version.

### Get the Best Sound

Tired of tinny sound from your Mac's puny speakers? Try one of these high-powered sound systems.

• Two subwoofer systems from MIDI Land (909/592-1168), the $100 MLi-SA15 and the $130 MLi-SA25, provide sound with minimum distortion. The MLi-SA15 outputs 15w (rms), while the MLi-SA25 outputs 25w. Both feature enclosures of medium-density fiberboard, which absorbs low-frequency noise and provides higher-quality sound.

• Yamaha's (714/522-9011, *http://www.yamaha.com*) YST-M7 is a multimedia speaker system that provides 5-watts-per-channel stereo output for the Mac. Due by fall, the $70 YST-M7 has a subwoofer output jack with volume control and dual stereo inputs, which eliminates the need to switch wires. Yamaha is also introducing the $200 YST System 35,

continues

# New Products

which pairs the YST-M7 speakers with its YST-MSW10 subwoofer (available separately for $150).

*Yamaha YST-M7*

## ONLINE

### HyperCard Stacks on the Web

Thanks to LiveCard, from Royal Software (813/581-6422, *http://www.heizer.com*), you can now add life to your HyperCard stacks by placing them on the World Wide Web. Stacks can be viewed from any platform using standard Web browsers. Users of the $150 package can write HyperCard scripts that create HTML forms, send E-mail, print invoices, and update Web pages remotely.

### Comet Sitings

Digital Comet (415/331-5551, *http://www.digitalcomet.com*) is staking its Internet claim with two new products. CometPage is an $80 package that lets you drag and drop templates, macros, and commands into Web pages created with a variety of Web authoring tools. CometSite, CometPage's $130 companion CGI, lets you test pages locally before uploading them to a server.

### Video on the Web

Video remains one of the Internet's final frontiers. Two recent trailblazers are Vivo Software (617/899-1400, *http://www.vivo.com*) and Terran Interactive (408/278-9026, *http://www.terran-int.com*), whose products allow you to put video on the World Wide Web. VivoActive Producer converts QuickTime movies into a proprietary format, with frame rates and compression ratios (up to 200:1) determined by the author. You view the videos using VivoActive Player, a Netscape plug-in available from Vivo's Web site. Terran is showing Web-Motion, a $99.95 plug-in for Movie Cleaner Pro ($159.95) that adapts QuickTime movies for Web pages. The software helps determine the optimal frame rate, playback size, and other settings, and generates HTML code needed to place movies in the Web page.

### Site Management

EveryWare Development (905/819-1173, *http://www.everyware.com*) is offering tools that allow you to manage complex Web sites. Bolero is a Web logging, analysis, and real-time reporting system that tells you the number of hits your site is getting, where the visitors are coming from, and what they do once they get there. Pricing begins at $995 for a version that supports a single Quarterdeck WebStar server. Tango Merchant gives businesses a 24-hour storefront for electronic commerce. At $4995 for a single "storefront" and $9995 for unlimited stores, it includes HTML templates created with Tango (EveryWare's Web-and-database integration tool), along with a point-and-click interface for online shopping and a relational SQL database for storing product information.

### Monkey on Your Mac

Internet Setup Monkey, from Rockstar Studios (415/242-1984, *http://www.rockstar.com*), lets Internet and intranet administrators create custom installers that automatically configure users' Macs for TCP/IP and PPP, Netscape Navigator, Eudora, and other Internet applications. License fees range from $1.90 to $2.50 for each distributed installer; a PPP plug-in that troubleshoots connection problems is included.

## PRINTING

### CalComp Adds to Plotter Line

CalComp (714/821-2000, *http://www.calcomp.com*) has added two models to its TechJet Designer line of ink-jet plotters. Model 5624, priced at $2495, produces D-size output, while the 5636 ($2995) offers E-size output. Resolution is 360 dpi in color and 720 dpi in black and white. A PostScript-compatible interpreter is an option.

## PUBLISHING

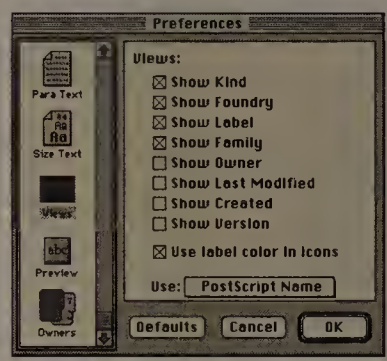
### Fonts for Every Occasion

Just when you think you've got every font you could possibly want, along comes a whole new group of selections—from elegant, old-world faces to whimsical animal fonts.

- Zetafonts (519/369-3898) has a collection of 12 unusual display fonts called Mainly Art Nouveau Fonts; these versions of historical font styles include Mahlau, Elmwood, Pixi, Philip, and Madrigal. Each font is $50; the set sells for $300.
- International Typeface Corporation (212/371-0699, *http://www.esselte.com/itc*) has released several new font sets. ITC Rennie Mackintoshx Light, Bold, and Ornaments are based on the hand lettering and motif designs of Charles Rennie Mackintosh. The ITC Golden Cockerlx font series is the first digital version of Eric Gill's classic type designs. ITC Kallos is a calligraphic font available in Type 1 and TrueType. ITC has also added five Fontek text faces originally developed by Letraset—Charlotte, Charlotte Sans, Elysium, Gilgamesh, and Figural. Each font is $40. Discounts are available for the purchase of three or more weights.
- Finfont is the newest collection of pictorial fonts from Judith Sutcliffe: The Electric Typographer (712/563-3799). Available for $45 (plus $2 postage), Finfont is a fanciful school of tropical fish from shark to sea horse.
- The AgfaType Collection CD-ROM version 7.0, from Agfa (508/658-5600, *http://www.agfa.com*), contains 4300 typefaces in four type libraries: the Creative Alliance Library (contemporary fonts), the Cornerstone Collection (classic fonts), the AgfaType Logo and Symbols Library, and the Adobe Library.

### Fonts in Reserve

DiamondSoft (415/381-3303, *http://www.fontreserve.com*) has introduced Font Reserve, a $120 font-management program that uses a database to store font names, font IDs, foundry information, version information, and each font's location in the system. It also checks for corrupted and duplicate fonts, and maintains corresponding pairs of Type 1 printer and screen fonts. You can view, open, and close fonts using the database.




*Font Reserve*

## STORAGE

### 16 CDs at a Time

Need to access several CDs on your network? Optical Access International (617/937-3910) has a solution: its new $8495 CD/Maxtet 1600, a CD-ROM server that contains 16 hot-swappable 4× CD-ROM drives. Better yet, the device uses only two SCSI IDs. A version using 4× CD-ROM drives costs $10,895. It works on Apple, Novell, Microsoft, IBM, and Banyan networks.

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Walter Payton as photographed by Lee Crum.

# Mac OS 8
## Back to Square One

**Apple has killed the Copland OS as we knew it. What's in store now?**

by Galen Gruman and Anita Epler

Copland, we hardly knew ye. For two years, Apple has painted a brave new world for the Mac OS, one that would bring a state-of-the-art infrastructure to today's OS, delivering agents to help automate your work, preemptive multitasking and threading to let programs do several things simultaneously, and an interface that would both simplify and customize your interactions with the Macintosh.

Rewind.

As *Macworld* revealed exclusively a month ago (see "Mac OS 8's About-Face," *News*, October 1996), Apple has dismantled its grand OS scheme. CEO Gilbert Amelio confirmed Apple's plans at the Boston Macworld Expo a few weeks ago, and AppleSoft vice-president Jim Gable has shared with *Macworld* more details on the new OS strategy.

The new strategy means that users will face a constant stream of OS updates: Apple plans to release new versions of system software quarterly, as well as semi-annual upgrades with substantial new technologies, interspersed with smaller bug-fix releases.

The new strategy also means that Copland—officially called Mac OS 8—and its follow-on, Gershwin, are essentially gone. Many of the technologies originally scheduled to be released with Copland and Gershwin will be developed for new versions of the Mac OS, but there is no grand target for what the future Mac OS will become. Instead, Apple's OS development will be more evolutionary, based on the technologies Apple can deliver when it can deliver them. Apple's new strategy is a mixed blessing—it's bad that there's no grand target to motivate users, developers, or Apple; it's good that there won't be broken promises.

The Copland name will still be used, but only to refer to groupings of technologies that Apple plans to deliver—Copland no longer means Mac OS 8, just the technologies once promised as Mac OS 8.

The current strategy change stems from decisions by Apple's new chief technology officer and vice-president of research and development, Ellen Hancock, who decided to end the mega-release Mac OS 8 strategy and focus on delivering real enhancements in a more timely way. That decision led to the incremental-update plan, supported by Amelio, and to the reorganization of engineers from several Mac OS teams (Harmony, Copland, and so forth) into one Apple Mac OS group.

Apple is being coy about its plans for the coming years, but *Macworld* has gleaned the following from interviews with Apple employees and from internal planning memos. Keep in mind that Apple's official line is often out of sync with its unofficial line, and that Apple is revisiting most of its strategies, so the company may again change its OS approach.

Some changes may come from outside pressure. The latest set of announcements has angered outside developers who are now unsure what to aim for; inside Apple, numerous engineers and product managers are also unclear on what the future holds, and many have seen their pet projects delayed or canceled. Because of these reactions, Apple may reconsider its changes. Be sure to check Macworld Online's ongoing coverage of this and other key stories at *http://www.macworld.com/daily/*.

### System 7.5 Shell Game

According to Apple's original schedule, we'd all be running Mac OS 8 today. But months ago, Apple realized it needed to do something in the interim, so it launched Harmony, a System 7.X version scheduled for early 1997, which was originally slated to incorporate parts of the Copland interface and wrap in revised versions of QuickTime, OpenDoc, Cyberdog, QuickDraw 3D, and the Finder. Apple officials presented detailed Harmony plans this May at the Worldwide Developers Conference.

That was May. In August, Harmony was clearly behind schedule, so Apple broke it into two pieces: one for January 1997 and one for summer 1997. The January System 7.X piece (perhaps to be called 7.6) will include updated versions of QuickTime, OpenDoc, Cyberdog, QuickDraw 3D, and the virtual memory manager, but no Copland technologies. "We'll have a few things there to wrap [these components] all together," says AppleSoft's Jim Gable, "but essentially there'll be no new stuff in January."

So why bother with the January release? "This is a big deal for Live Objects developers," said Gable. (Live Objects is the new name for OpenDoc components; the engine and the architecture retain the name OpenDoc.) "With this release they can expect the infrastructure to be in place that they need," without having to include OpenDoc with their products. Developers won't need a license from Apple to distribute OpenDoc.

The System 7.Y release—slated for July 1997—will be more in line with previous reports of Harmony's features. "This is where we'll start to see Copland technologies," says Gable. Apple still isn't sure what Copland features it will roll out in July. Gable states, "We've got to do some homework to find out what we can include. We don't know how much we can decouple." This is frustrating for users and developers alike, but probably the right thing to do considering Apple's poor track record in predicting OS components.

### Mac OS 8's Shadowy Future

So when will Mac OS 8 ship? No one knows. The official date is late 1997, but Gable acknowledges that this is optimistic: "I don't know when it will ship."

When does the name change to Mac OS 8? No one knows that, either. Gable says it's no sure bet when the OS number will change from 7 to 8. The logical time to change the number is when the new microkernel is incorporated into the Mac OS, since the microkernel is the guts of the OS, and changing it is what gives Apple the ability to add most of the Copland features that so excited us a year ago: preemptive multitasking, protected memory, and so forth.

But Gable says no decision has been made on what will constitute the number change. It could be the microkernel, or it may simply be when Apple runs out of decimal places for System 7.X.

Copland as originally defined is gone, and so is Gershwin, the planned successor to Copland. Copland was supposed to be a way station to Gershwin, with Copland being the Mac OS that introduced preemptive multitasking, multithreading, and protected memory—all key to seamlessly operating simultaneous programs and to reducing system crashes and application conflicts. Copland was supposed to be like Windows 95, in which these services are available for the operating system but applications still share memory and have to multitask cooperatively (as they do in System 7). Gershwin was to introduce preemptive multitasking, multithreading, and protected memory between applications, so each would reside in its own safe space (as in OS/2 and Windows NT). The good news is that by not shipping Copland/Gershwin as originally planned, the Mac OS might see full preemptive multitasking earlier than the original Gershwin schedule.

Because Mac OS 8 remains undefined, no one—developers or Apple engineers—really knows what to aim for. The effect has been dramatic. Finally poised for the first developer (beta) release of Copland—known as DR1—in early August, Apple pulled the plug unexpectedly during Macworld Expo. "We're not going to release it as it is," Gable says, while confirming that those developers who work on low-level code will receive some subset of the current beta and that engineering work will continue on Copland DR1.

Gable says rank-and-file applications developers will be seeded for interim OS releases but won't receive DR1. "Because we're not going to be doing a single, monolithic release, there's no reason to release what we have," he says. "There's a tremendous amount of work in there, [but] a single, monolithic seed is wrong."

Some developers have interpreted the

ILLUSTRATIONS BY JOHN RITTER

## Reading Apple's OS Tea Leaves

Based on *Macworld*'s best estimates of where Apple is taking the Mac OS, here is a tentative timeline. Bear in mind that Apple is reconsidering every aspect of its OS, and even our best estimates are likely to change as Apple revisits its decisions in the coming months.

| | |
|---|---|
| WINTER 1997 | • **System 7.X**, code-named Harmony, will bundle System 7.5.3 with some bug-fixes, QuickTime 2.5, QuickDraw 3D 1.5, OpenDoc 1.1, and Cyberdog 1.1, plus enhanced virtual memory management and perhaps other Cyberdog-oriented Internet tools.<br>• **CHRP version** of System 7.X.<br>• **Open Transport/PPP.** |
| SPRING 1997 | • **Apple Remote Access 3.0.**<br>• **Bug-fix collection.** |
| SUMMER 1997 | • **System 7.Y**, the original update code-named Harmony and now called Tempo, will likely include some of the original Copland interface components plus bug-fixes and perhaps some of the active assistance technology promised for Copland. Expect updates to other major system components, such as QuickTime and Open Transport. |
| FALL 1997 | • **Bug-fix collection.** |
| WINTER/SPRING 1998 | • **Mac OS 8 1.0**, with the new microkernel and file system, and perhaps with protected memory for the Mac OS itself, to minimize crashes. This would mean a new system-extensions architecture as well.<br>• **New version of AppleShare.** |
| SPRING 1998 | • **Bug-fix collection.** |
| SUMMER/FALL 1998 | • **Mac OS 8 1.X**, with some preemptive multitasking and multithreading capabilities, plus updates to major system components and bug-fixes. |
| FALL 1998 | • **Bug-fix collection.** |

DR1 pullback as a sign that Apple's commitment to them has waned. But Apple's Gil Amelio acknowledges that the company will have to work closely with developers to ensure that they have the tools they need to support the system updates.

**The OS That Keeps On Coming**

In an interview with *Macworld*, Apple's CTO Hancock made it clear that Apple can't keep giving away the Mac OS. Apple needs to find a way to make money from it to pay for its continued development, she asserts. This subscription-like release plan may be one of those ways.

Gable notes that one advantage of the new incremental-release plan is that many Copland technologies will now run on 68040-based Macs, 680X0 Macs with PowerPC upgrade cards, and perhaps even some 030-based Macs. (Under the original plan, Copland wouldn't run on any of these.) Now that there is no unified mega-release, Apple can decide on a component-by-component basis whether a technology will perform on 680X0 Macs.

"Now you don't have to wait for the next major release to get neat new stuff," Amelio says. He points to the Mac OS's complexity as justification for rolling out the next operating system piece by piece.

Of course, there's danger for Apple, even if it has no choice: major architectural changes—such as incorporating a new microkernel or adding preemptive multitasking—generally don't lend themselves to being rolled out in piecemeal fashion. "That's one of the things we have to figure out," admits Gable. "No one really knows for sure."

**The Last Word**

The Mac OS is now officially a moving target. By necessity, Apple has converted Mac OS 8 from a goal to a journey. It's not at all clear where that journey will take us. That's unsettling. Apple needs to illuminate the path it's on, without again setting us up with unrealistic expectations. Right now, we have no expectations. In the coming months, let's hope that Apple gives us a new set of Mac OS expectations so we know the platform will continue to move forward, without inflating our hopes and then dashing them. m

Senior associate editor ANITA EPLER and executive editor GALEN GRUMAN both follow Mac systems developments closely. Additional reporting by HOWARD BALDWIN.

# Open Transport Clears the First Hurdle

**But Apple still has a ways to go in its network software**

by Elizabeth Dougherty

Remember the shifts from the 680X0 architecture to the PowerPC and from System 6 to System 7? Both needed to happen, but it wasn't until after the fact that users and developers saw the benefits. Similar transitions are taking place for Macintosh networking as networks move from LocalTalk to Ethernet, from AppleTalk to TCP/IP, and from classic networking to Open Transport. Here's a look at how Apple's network strategy addresses these transitions.

**Bug-Fixes This Summer**

Open Transport, first released over a year ago, is the Mac OS's next-generation network and communications foundation. Its modernized AppleTalk and TCP/IP protocol stacks speed network transmissions, its enhanced control panels improve network-configuration options, and its open APIs help developers write applications that can take advantage of Open Transport's streamlined architecture. Unfortunately, Open Transport's launch was rocky; versions 1.0 and 1.1 suffered from performance problems and assorted bugs.

Open Transport 1.1.1, scheduled to ship as part of System 7.X in January, fixes bugs in version 1.1 and increases performance. Current system software includes Open Transport and Apple's previous implementation of AppleTalk and TCP/IP (which Apple calls *classic networking;* it's required for 68020 Mac models and below). However, starting with System 7.X, Apple will ship only Open Transport (no classic networking) with the Mac OS and its updates.

One of the most significant improvements in Open Transport 1.1.1 is more-efficient memory recycling, which will increase the performance of servers with high transaction volumes (Web servers, for instance).

Another bug-fix allows Open Transport 1.1.1 to run on the 5200, 5300, 6200, and 6300 Performas. Open Transport 1.1.1 also fixes some problems with Apple Remote Access, such as its not seeing all network devices, and problems with PowerBooks' recovering from sleep mode.

**Open Transport's Next Big Step**

Open Transport 1.5 is scheduled to ship as part of Tempo, the Mac OS release slated for July 1997.

Open Transport 1.5's support for multiple active-network interface ports will let you have Ethernet, LocalTalk, and infrared ports active simultaneously; it will also allow a server to use

## Finally, Apple Remote Access Goes PPP

Over three years ago, Apple said it would deliver Apple Remote Access software that would provide dial-in capability via the Point to Point Protocol. PPP supports multiple protocols, including AppleTalk, TCP/IP, and NetWare's IPX; it had—and still has—widespread industry support.

Finally, in August of this year, Apple took its first steps toward PPP support by releasing a beta of Open Transport/PPP to replace the freeware MacPPP (OT/PPP is scheduled to ship in October). Product manager Richard Ford acknowledged that Windows 95's including TCP/IP over PPP accelerated Apple's efforts to get OT/PPP into users' hands.

In the first half of 1997, Apple expects to ship Apple Remote Access 3.0, which will run AppleTalk and/or IP over PPP, or the AppleTalk Remote Access Protocol (ARAP) over PPP. Upgrades for the client and the personal server will be offered, but pricing was not set at press time.

The ARA client will be part of a future version of the Mac OS, says Ford.

multiple Ethernet cards.

Support for multiple addresses for the same port (called multihoming) via TCP/IP and AppleTalk will allow a Web server to have one Ethernet port for multiple TCP/IP addresses.

Open Transport 1.5 will also include built-in PPP, which eliminates the need for a separate dialer, and Open Transport's built-in LocalTalk bridge software will let you share a printer connected to your Mac.

Network managers will be happy to see the long-awaited update of MacSNMP; version 1.5 will ship with Open Transport 1.5.

You can use AppleScript to customize the control panels—for example, setting different configurations for Ethernet access at work and dial-up access from home. You can save configurations and import or export them via drag and drop, which will be handy for network managers distributing remote-access configurations.

**AppleShare over TCP/IP**

While Open Transport has helped Apple make strides in providing TCP/IP for clients, Apple has lagged behind the rest of the computer industry with servers.

AppleShare client software included with the Mac OS allows file sharing and printing via the AppleTalk Filing Protocol (AFP), which runs over AppleTalk. Open Transport contains an updated AppleTalk stack, as well as code that provides backward compatibility with existing AppleTalk implementations. Apple will maintain AppleTalk but will not invest any significant effort in upgrading it, according to Andy Lauta, manager of product marketing for AppleNet.

Instead, Apple is working on an enhanced version of AppleShare that will support AFP over TCP/IP, HTTP for Web servers, FTP, and Internet mail protocols. This new version of AppleShare, code-named FutureShare, is scheduled to ship in early 1997, according to product manager Joe Sowerby. AppleShare Workstation Client version 3.7 and the new AppleShare server will run AFP over both TCP/IP and AppleTalk.

The new AppleShare server software will be required for TCP/IP file and print services; you will not be able to use the Personal File Sharing peer-to-peer model for TCP/IP. That should start moving the masses away from AppleTalk.

**The Last Word**

At press time, Apple had not decided how FutureShare will be sold or priced. Currently, if you want to buy PowerPC-native AppleShare 4.2.1, you have to buy an Apple Workgroup Server; you can't buy the software separately—an odd model for a company that should be encouraging people to use its software, especially something as fundamental as its network operating system. **m**

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Associate editor ELIZABETH DOUGHERTY covers networking and intranet issues.

# OpenDoc Finally Gets Tangible

**Developers are now supporting component software—why it matters to you**

by Cameron Crotty

After two years of promise, Apple's OpenDoc technology is starting to deliver. Apple introduced version 1.1 of OpenDoc at Macworld Expo in August, and developers announced 16 new OpenDoc products.

CI Labs, the organization dedicated to compliance with specifications created by the Object Management Group, an industry consortium, announced that OpenDoc-based components will be called Live Objects. CI Labs will also introduce the Live Objects Validation Kit, which developers can use to test their components for compatibility.

According to Apple product manager Gina Centoni, OpenDoc 1.1 (available online at *http://www.opendoc.apple.com*) focuses mainly on optimization, reducing the RAM footprint, and increasing the performance on both PowerPC and 680X0 Macs. Along with OpenDoc 1.1, Apple will release the Apple Live Objects Essentials Kit—a set of basic OpenDoc parts, including text, image, and sound editors as well as viewers for Apple-sponsored data types such as QuickDraw 3D, QuickTime Conferencing, and QuickTime VR.

**Plugging In Other Plug-Ins**

OpenDoc is not the only architecture to let developers create small pieces of software that can plug in to other programs and the OS. Microsoft has its competing Object Linking and Embedding (OLE), as well as the ActiveX subset being positioned for the Web, while Sun has Java, also positioned for the Web. Rather than fight them, Apple is embracing them—encapsulating them, to be more accurate.

Mac OLE users can expect OpenDoc interoperability soon: at Macworld Expo, Apple demonstrated the ComponentGlue "wrapping" that lets OLE parts work with Mac OpenDoc system extensions; ComponentGlue is expected to ship soon.

This past spring, Apple promised to bring Java to the Mac OS, and the first fruits of that labor have appeared. The Mac OS Runtime for Java is now available at *http://www.devtools.apple.com/mrj/*.

The prerelease version 1.0a1 includes three ways to run Java applets: a stand-

alone application (Applet Runner), an OpenDoc part (Applet Viewer), and a screen-saver module compatible with Berkeley Systems' After Dark utility. Applet Viewer and Applet Runner can both load and launch applets from a hard drive or the Internet.

Applet Runner works on both Power Macs and 680X0 Macs, while Applet Viewer requires OpenDoc version 1.0.4 or later. Apple says that the final version of Cyberdog 1.1 will support Applet

Viewer. The Mac OS Runtime package includes several example applets from the Sun 1.0.2 Java Development Kit.

**OpenDoc's Increased Supporters**

IBM assures *Macworld* that it is on track to ship OpenDoc for Windows by the end of the year. However, it's not clear whether OpenDoc will make a dent on the Windows platform, where OLE has been heavily adopted for the last two years and where ActiveX seems to be following a similar path to majority status.

But on the Mac, OpenDoc appears to be gaining the steam needed to succeed.

**The Last Word**

The promise of OpenDoc remains one for developers—it's a way to break programs into small pieces that can be more easily managed or used across programs, as well as a way to get paid to add functions to someone else's programs. For users, OpenDoc is simply a universal plug-in architecture that may now actually become universal on the Mac. m

Associate editor CAMERON CROTTY covers the Internet, OpenDoc, and other interaction technologies.

## OpenDoc Developers

The following companies introduced OpenDoc parts at Macworld Expo.

- **Addison-Wesley New Media Products Group/West:** Virtual Field Trips
- **Aladdin Systems:** Stuffit InstallerMaker 3.1
- **Bowers Development:** AppMaker
- **ComGrafix:** GeoInsight
- **Corda Technologies:** C-Graph and C-Table
- **Digital Harbor:** Wav
- **Eastgate Systems:** Web Squirrel
- **Eclipse Services:** Outliner
- **Kantara Development:** Partfinder
- **MetaMind:** PageComposer
- **Network Multimedia:** Microbrew
- **Power Productions:** WebBurst
- **SoftLinc:** Lexl
- **Theta Group:** dtF Database Toolkit
- **Totally Hip Software:** Sizzler
- **WordSoft:** WorldWrite

Previously announced OpenDoc parts include:

- **Claris:** ClarisWorks
- **Corel:** WordPerfect
- **Nisus:** Nisus Writer

# Media Components Come Together

**QuickTime Media Layer integrates dynamic technologies**

by Stephen Beale

QuickTime must be near the top of the list as Apple's new leadership surveys the company's strategic assets. From its humble beginnings as a low-resolution movie player, QuickTime has evolved into a comprehensive architecture for the authoring and playback of synchronized video, audio, graphics, and text, elevating the Macintosh into a leading platform for multimedia creation.

QuickTime 2.5, which began shipping this summer, is the core of what Apple now calls the QuickTime Media Layer (QTML). QTML encompasses the software technologies within Apple's Interactive Media Group, including QuickDraw 3D, QuickTime VR, and QuickTime Conferencing, in addition to QuickTime itself.

Much of what's new in QuickTime 2.5 is under the hood: support for multiprocessor hardware; an improved primary data handler for faster playback; asynchronous JPEG and Raw codecs that can compress or decompress video as QuickTime performs other functions; and a new Clock component that enhances synchronization of video and sound. Other features are more explicit. Support for QuickDraw 3D allows content creators to incorporate 3-D objects within QuickTime movies. A graphic-importer component expands the range of file formats QuickTime supports directly.

For video professionals, QuickTime now implements a standard interchangeable format for Motion JPEG, a popular codec previously available from several board vendors in incompatible flavors. On a more esoteric note, QuickTime now allows digital-video editors to extract fields within a frame (each frame of video consists of two alternating fields). If you capture video with closed-caption text, you can now embed the text in a QuickTime text track. For musicians, Apple has enhanced QuickTime's support for the popular MIDI interface. Previously, QuickTime included a software synthesizer and an instrument library licensed from Roland. With QuickTime 2.5, any vendor can offer QuickTime versions of synthesizers and instrument libraries.

All this comes in the wake of improvements to other QTML components. Apple has shown a new version of QuickTime VR that allows the embedding of QuickTime movies and 3-D graphics into panoramas. QuickDraw 3D 1.5, announced in August, offers a host of features that move it much closer to being a serious 3-D authoring environment (see "A New Spin for 3-D Graphics," *News*, *Macworld*, October 1996). Apple has even announced a QuickTime-based technology, QuickTime IC, that will allow the development of digital cameras with built-in functions—such as time-lapse photography, Internet connection, and image filters—that would otherwise be implemented in software on the host computer.

**Microsoft Plays Catch-up**

Apple has enhanced QuickTime so aggressively that Microsoft has been forced to play a constant game of catch-up. Its first response to QuickTime, Video for Windows, was to establish a Windows-based alternative to QuickTime, but it performed poorly and lacked QuickTime's rich support of multimedia data types. ActiveMovie, Microsoft's latest response, is much closer to offering QuickTime-like features. It will gain instant credibility due to Microsoft's huge installed base, but QuickTime has the benefit of being better established among multimedia pros.

Meanwhile, Apple is expanding QuickTime to other platforms. Soon you'll be able to author QuickTime movies under Windows, not just play them. Apple has also moved QuickTime into the Unix realm, announcing early this year that Silicon Graphics would incorporate QuickTime playback capabil-

ities into its StudioCentral software, which allows movie and TV producers to keep track of their media assets.

Ultimately, Apple would like to see QuickTime become a standard for supporting dynamic media on the World Wide Web. Apple has released a Netscape plug-in that permits the viewing of QuickTime movies, and in April Apple announced that Navigator 3.0 would include the plug-in.

**The Last Word**

So what's left? The beauty of QuickTime is that it is highly scalable; the same technology that allows hobbyists to edit home videos has also become increasingly useful for multimedia and video-production professionals. Expect to see further moves into the professional realm, including support for ever-increasing levels of resolution. Expect to see new compression technologies; Cinepak, the primary codec in QuickTime, is getting long in the tooth. Expect to see the ability to incorporate interactive elements into QuickTime movies.

QuickTime has done for multimedia professionals what Adobe's PostScript did for print: provided a core set of technologies around which hardware and software developers could build cutting-edge products. It didn't duplicate existing technologies or attempt to upstage Apple's third-party developers. QuickTime is clearly a model for Apple to use elsewhere. m

# Apple Revives QuickDraw GX

**Graphics and type functions become available as a shared library**

by Stephen Beale

Apple, attempting to boost its moribund QuickDraw GX technology, will unbundle the graphics and typography portions of GX and provide them to software developers as a dynamically loading shared library. As a result, users who have not installed QuickDraw GX will now be able to run GX-dependent applications. And because the library does not include GX printing functions, you won't have to change the way you print, at least not until GX is fully incorporated into the Mac OS. However, you'll still need special GX fonts to take advantage of the technology's advanced typographic functions.

QuickDraw GX is now an optional extension to System 7.5, but it's supposed to be an integral part of Mac OS 8. It offers a host of sophisticated graphics capabilities, especially in type: up to 65,535 character shapes per font, automatic ligature substitution, built-in kerning functions, and more, all available to any GX-dependent application. It also provides a new printing architecture for the Macintosh, one in which output functions are controlled by icons on your desktop rather than the familiar Chooser.

**Early Problems**

Despite these features, GX has so far failed to catch on with users or developers. Early versions have been plagued by bugs, hefty RAM requirements, and difficult handling of PostScript fonts. The list of "GX-smart" applications is short, and the list of GX-dependent packages even shorter. Only a handful of type foundries

offer GX typefaces. Worse, none of the major graphics software vendors—Adobe, Fractal, Macromedia, and Quark—has shown interest in GX, due in part to the lack of a Windows version.

However, GX has provided a breeding ground for a few small developers, such as Lari Software (919/968-0701, *http://www.larisoftware.com*), PaceWorks (415/855-0900, *http://www.paceworks.com*), and SoftPress (415/331-4820, *http://www.softpress.com*), that see GX as an opportunity to break into markets that would otherwise be closed to them.

Now that Apple is offering GX as a shared library, users can get a taste of the technology, says Phac Le Tuan, vice president of engineering for PaceWorks. Dancer, the company's flagship product, is a GX-based animation and multimedia authoring tool.

Electrifier, developed by Lari and available free from the Electrifier Web site (*http://www.electrifier.com*), allows you to view GX-based vector graphics and animations over the World Wide Web using Netscape-compatible browsers. A forthcoming version developed by Lari and PaceWorks will allow the use of Electrifier graphics within QuickTime movies. The companies claim that the vector-based animations can be hundreds of times smaller than equivalent bitmapped animations, solving the bandwidth problems endemic to the Web. You can create Electrifier graphics from PICT or Illustrator files using LightningDraw Electric, available free on Lari's Web site.

**Cross-Platform Issues**

Still, until a Windows version of GX is available, major developers with cross-platform graphics products are unlikely to embrace the Apple technology. Nevertheless, you can expect an announcement on cross-platform GX availability by the end of the year, says Carla Ow, Apple's GX product manager. It is likely, she says, that Apple will offer at least a Windows-based GX playback tool. Less certain is a full-fledged Windows GX.

**The Last Word**

By transforming the GX graphics and typography functions into a shared library, Apple rewards the developers who have taken a chance on GX while removing one of the most problematic aspects of the technology: the printing architecture. But Apple still has far to go before it establishes QuickDraw GX as a must-have environment for graphics creation. m

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Senior associate editor STEPHEN BEALE follows graphics and publishing technology, and manages *Macworld's* news. Additional reporting by JASON L. LEVINE.

# Introducing three things you might not expect from Motorola.

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# Reviews

## Color Ink-Jet Printers

EPSON'S STYLUS COLOR 500 BRINGS HOME THE GOLD AGAINST FIERCE CHALLENGERS

SUZANNE ROADY

THE HOTTEST COMPETITION OF the summer took place not on the playing fields of Atlanta, but on the floor of Boston's Macworld Expo, where both Canon and Epson won *Macworld*'s Best of Show for their new color ink-jet printers. Canon's BJC-4550 supports 720-by-360-dpi output on 11-by-17-inch paper for a remarkable $500 price, while the Epson Stylus Color 500 delivers great graphic output for a street price under $300. Hewlett-Packard also recently began shipping the DeskWriter 680c, an update to its popular 660c. For small offices or home users, this trio provides a range of options.

Differences are immediately apparent: the BJC-4550 is bigger than its competitors, allowing for its large-format output. HP's 680c uses a front-loading paper tray with an option for printing banners, and a raised output tray. Meanwhile, Epson hasn't been investing in industrial design: compared with the modern curves and cool white casing of the other printers, the 500's square shape and cream shading are positively old-fashioned. But output quality, speed, reliability, and price are far more important than style, and in those areas the Stylus Color 500 outpaces the competition.

### The Dream Graphic

Comparing graphic output is like watching Olympic men's basketball: the output from the Stylus Color 500's Super mode (720 dpi) is so far superior to the others' that there is no contest. Even the 500's Best mode (360 dpi) is better than the competition's highest-quality options. That said, the output from the HP and the Canon is still world-class. All three printers produced perfectly presentable graphics, and output from the BJC-4550 and the 680c is fine for most jobs. (Canon sells special photographic ink and high-res paper; with these, the BJC-4550's output could easily join the NBA.)

Text output is a slightly different story. In normal mode, using plain paper, the 680c's text output came out ahead. The 680c prints color images at 300 dpi but boosts black text to 600 dpi. Text was smooth and dark, with none of the fuzziness typical of ink-jet printers. However, all the printers produced clear text, and any of them would be satisfactory for a home or small-business user.

### Track and Field

If you're used to laser printers, you'll be unpleasantly surprised by how slow color ink-jet printers actually are. Still, the new models are faster than their predecessors.

| RATINGS | Outstanding ★★★★★ = 9.0–10.0 | Very Good ★★★★ = 7.0–8.9 | Good ★★★ = 5.0–6.9 | Flawed ★★ = 3.0–4.9 | Unacceptable ★ = 0–2.9 |
|---|---|---|---|---|---|

In midrange modes, printing a complex graphic took 3½ to 5 minutes, while a simple ClarisWorks newsletter took 1½ to 2½ minutes. In high-quality modes, these printers crawl: in the worst case, the BJC-4550 took an incredible 32 minutes to print a 10-page word-processing file.

The overall winner is clearly the Stylus Color 500. In its midrange mode, it was the fastest printer in five of six tests, and tied the sixth. In high-quality mode, it also won five tests. When printing QuarkXPress newsletters and spreadsheets with charts in this mode, the 500 was faster than its nearest competition by as much as 4½ minutes—roughly 1½ times as fast. The only exception was in printing a long text document, where the 680c beat the 500 by close to 10 minutes, despite taking a painful 12 minutes to complete the job.

### . . . And on to Gymnastics

Just as the Olympic gymnastics judges see a single performance, Macworld Lab usually sees a single sample of each printer we test. And while we try to be scrupulously fair, minor flaws count for a lot as we attempt to measure reliability. We experienced problems with all three printers.

The first 680c we received was dead on arrival. HP's tech support was efficient and helpful, offering to send us a new printer overnight. Our replacement ran beautifully, and the 680c emerged as the Kerri Strug of color ink-jets.

The Stylus Color 500 experienced a number of problems. On occasion, the print head would lose its place and start printing from the center of the paper, causing the head to smash into the side of the printer. The head also clogged easily and had to be cleaned regularly. Epson's tech support was cheerful and responsive.

During our tests, the BJC-4550 began printing miniature documents, 20 percent of normal size. We believe the problem resulted from a corrupted printer driver, which we resolved by reinstalling the software. Unfortunately, Canon tech support fell down on the job.

### Lucrative Endorsements

These printers are all bargains. The 680c and the Stylus Color 500 have street prices under $300, which is as cheap as color ink-jets currently come. At $500, the BJC-4550 looks expensive by comparison, but other 11-by-17-inch printers, such as the Epson Stylus Pro XL, cost closer to $2000. Canon also offers a PostScript option for an additional $99.

The cost of consumables can add up for color printers. None of these products require special paper, but their output looks far better on glossy stock; you'll want to spend the extra $20 to $30 for 200 sheets for your important work. Epson and HP use similar ink cartridges, but HP's prices are slightly higher. The BJC-4550, meanwhile, seems to eat ink: we used it up at an appalling rate. Canon's ink cartridges include a print head and replaceable ink tanks; the tanks cover only 100 to 200 pages. (The BJC-4550 also offers other ink choices, including neon and photographic colors.)

### The Other Sports

The 680c had the best, most straightforward driver software. Although the Epson and the Canon offer some sophisticated features, their software is complex and sometimes less than intuitive.

The Stylus Color 500 and the BJC-4550 came with bundled software: unfortunately, Canon's two–CD-ROM set is for Windows only. Epson's Look Your Best Color Pak includes Adobe HomePublisher and PhotoDeluxe.

The documentation for the 680c is Mac-specific, thorough, and includes a detailed troubleshooting section. Epson's manual covers both Macs and PCs, and is well written and helpful. The 4550's QuickStart Guide is handy, but its documentation is otherwise not terribly deep.

### The Last Word

If you need 11-by-17-inch output, the Canon BJC-4550 is your choice. For printing documents that are mainly text, with some graphics, the HP DeskWriter 680c is a fine, reliable printer. But the gold medal clearly goes to Epson's Stylus Color 500: its output quality is excellent, its speed is superior, and its price is just right.—WENDY SHARP

#### Canon BJC-4550

**RATING:** ★★★/6.9 **PROS:** 11-by-17-inch output; photo and neon inks; low price. **CONS:** Bundled Windows-only software; slow in high-quality mode. **COMPANY:** Canon (714/438-3000, *http://www.ccsi.canon.com*). **LIST PRICE:** $499.

#### Epson Stylus Color 500

**RATING:** ★★★★/7.8 **PROS:** Great graphic output; fast; low price. **CONS:** Print heads need to be cleaned frequently; unintuitive software. **COMPANY:** Epson (310/782-0770, *http://www.epson.com*). **LIST PRICE:** $379.

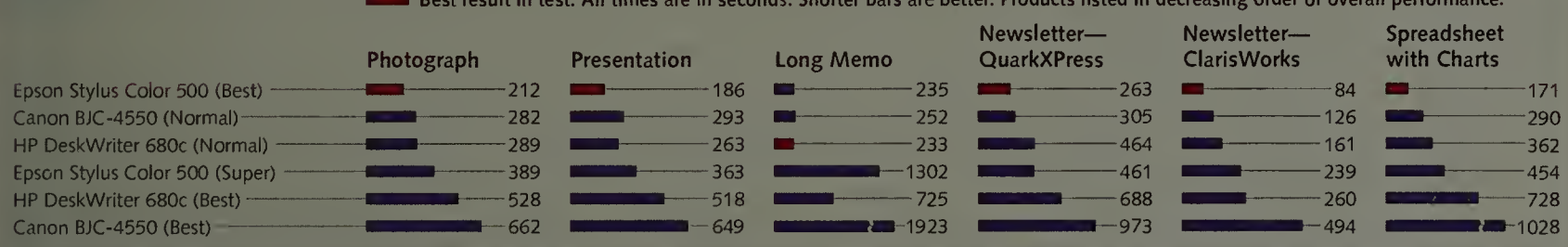
#### Hewlett-Packard DeskWriter 680c

**RATING:** ★★★★/7.2 **PROS:** Good output with nice text; straightforward software; reliable; low price. **CONS:** Slow. **COMPANY:** Hewlett-Packard (208/323-2551, *http://www.hp.com*). **LIST PRICE:** $357.

MW LAB

## Epson's Stylus Color 500 Gets the Gold

Best result in test. All times are in seconds. Shorter bars are better. Products listed in decreasing order of overall performance.




### Behind Our Tests

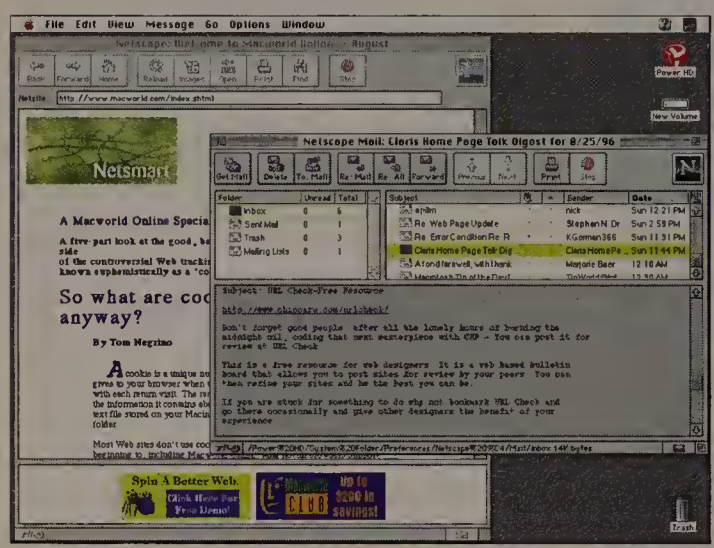
All tests were performed on a Power Mac 7500/100 with 32MB of RAM, a 256K Level 2 cache, and System 7.5.3 and ATM 3.9 installed.
—Macworld Lab testing supervised by Jeff Sacilotto

# Netscape Navigator 3.0

## STILL THE BEST BROWSER, BUT COULD USE A DIET

THIS MONTH'S ENTRY IN THE WEB-browser wars comes from the 800-pound Mozilla, as the long-anticipated Netscape Navigator 3.0 dives into the fray. Since Netscape's 2.0 version, Microsoft's surprisingly competitive Internet Explorer 2.0 has been fighting back hard; now, in response, Navigator 3.0 arrives with enough new Web goodies to stun the contender from Redmond.

New to Navigator 3.0 is support for different sound formats (including music that can play in the background of Web pages); QuickTime movies; and best of all, Java, which lets you enhance your Web pages with mini applications known as *applets*. JavaScript, Navigator's built-in scripting language, has new commands and bug-fixes. There's also increased support for HTML 3.2 tags, and as usual, Netscape has thrown in some new tags of its own, including ones for multicolumnar text, background colors in tables, and font control. On the security front, Navigator 3.0 includes harder-to-crack 128-bit encryption keys, up from the 40-bit keys in the previous version. At press time, Netscape hadn't shipped the Mac plug-ins for Live3D, which implements its VRML support, or for CoolTalk, the Internet phone feature. Also still in beta was Navigator Gold 3.0, which adds a WYSIWYG HTML editor to the program.




**Mail Call** Even on a 17-inch monitor, reading mail with Navigator can be a bit cramped, although having URLs as live links is a nice feature. And even while checking my mail, I could hear a sound file playing from the Web page in the background.

### RAM Hungry—and Proud of It

Navigator 3.0 isn't frugal in its requirements: including the Java components, it takes up 8.3MB of disk space, and you'll probably want to reserve another 5MB or so for the cache folder, which stores pictures and text from your frequently visited sites. The program also asks for a whopping 9MB of RAM. Adding insult to injury, loading a Web page with a lot of text or even a small Macromedia Shockwave animation often causes Navigator to complain that it is out of memory, request more, and abort the page load. In contrast, Internet Explorer 2.0 gets by with 4MB of your hard disk and 4MB of RAM, and doesn't choke on big pages.

Navigator's speed in loading Web pages is good, although due to the real-world vagaries of loading pages over the Internet, my tests were necessarily informal. Internet Explorer loads pages from the Web at about the same speed as Navigator, but beats Navigator hands down in reloading viewed pages. While pressing Navigator's Back button leads to a perceptible wait, clicking on Internet Explorer's Back button causes text and graphics to snap back onto the screen almost instantly. Internet Explorer also gives the impression of being faster when loading pages because it displays text immediately, then fills in the images.

### Getting the Mail, Reading the News

Navigator's improved integrated E-mail and Usenet news modules are serviceable and convenient, but they lack features found in stand-alone mail and news programs. Both modules display their information in a window containing three resizable frames. The largest frame contains the current E-mail message or Usenet posting. The two smaller frames list your selected newsgroups and a list of postings (in the news module) or a list of your mail folders and the mail list (in the mail module). Stuffing all these functions into one window makes the modules feel cramped, even on a good-sized monitor (see "Mail Call").

The mail module has some unique features: you can send and receive HTML documents, and the recipients (if they're also using Navigator) see them as if they were actual Web pages, including text, graphics, multimedia, Java, and JavaScript. URLs in mail messages (and Usenet postings) appear as links. You can also create as many mail folders as you wish, which helps in organizing your messages.

As is the unfortunate case with most Web browsers, including Internet Explorer 2.0, Navigator 3.0 crashes. A lot. A long surfing session almost always ends with a crash, usually of the freezing-the-whole-Mac variety. I often take this as a sign that it's time to turn off the computer and just go to bed. Still, there's no excuse for this sort of instability in an application that has become a basic tool for so many people.

### The Last Word

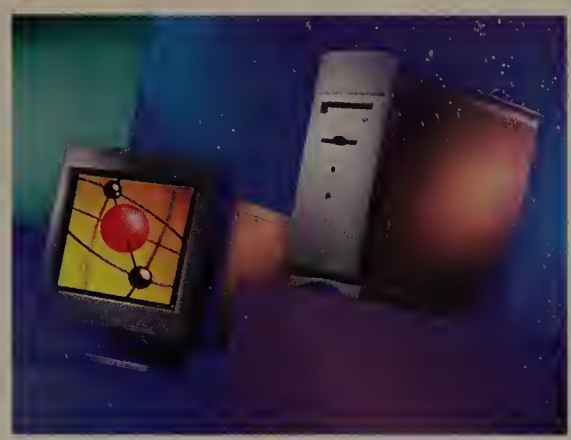
The frenzied pressure to compete in the browser market has brought forth another winner from Netscape. As the only shipping browser that supports Java, Navigator 3.0 gives Macintosh users a much-needed window into this exciting addition to the Web experience. With its built-in mail and news clients, it may be the only Internet program many users need. Unfortunately, the program sucks up more than its fair share of system resources, and the pressure to revise products quickly (Navigator 4.0 is expected to begin public beta testing before 1997 rolls around) has made Navigator 3.0 less stable than it should be.

Netscape Navigator 3.0 is still the best Web browser available for the Macintosh. But it comes with enough flaws that Netscape should hardly rest easy, especially with the next Macintosh release of Internet Explorer just around the corner.—TOM NEGRINO

**RATING:** ★★★★/7.4 **PROS:** Excellent Web-page display; Java support; integrated mail and news. **CONS:** RAM hog; crash prone; some touted features aren't yet shipping for the Macintosh. **COMPANY:** Netscape Communications (415/937-2555, *http://www.netscape.com*). **LIST PRICE:** $49.

# Performa 6400/200

DELIGHTFUL SOHO SYSTEM, AT A PRICE



KEVIN CANDLAND

DOWN AT MY LOCAL ELECTRONICS store, I'm always greeted by a familiar scenario: five to ten Intel-based PCs running superexciting video and blasting out jazzy tunes. And then there's the lone Performa. Like a wallflower at the prom, it sits quietly, waiting for someone to come by and discover the power of Macintosh.

Enter the Performa 6400, a new breed of Performa design. Nicely packaged in a sporty minitower chassis with scads of power and lots of room for expansion, it's also packed to the gills with entertainment, education, and productivity software.

The Performa 6400/200 is powered by a 200MHz PowerPC 603e and a 256K Level 2 cache. It comes stock with 16MB of RAM, upgradable to 136MB via two DIMM sockets. Storage includes a floppy drive, an 8× CD-ROM and a 2.4GB hard drive, and an empty 5.25-inch expansion bay for additional goodies. A Global Village Teleport Platinum 28.8-Kbps fax modem is built in. Expansion options include two 7-inch PCI slots and two proprietary slots. (A 180MHz version with a 1.6GB hard drive but without the L2 cache is available for $2399.)

The Performa 6400's speed is roughly equivalent to that of a Power Mac 8500/132. In subjective tests, I was never disappointed in the performance of any application, though I did run out of memory on several occasions. I *was* disappointed, however, that the Performa 6400's really fun stuff is optional. Add-ons include the $159 Apple TV/FM Radio System to put a TV and FM radio on your desktop, Avid Cinema for full-motion video capture and output ($459), and a PC Compatibility Card—a Pentium-class coprocessor for running Windows and DOS applications—for $799.

### A New Beginning

A positive out-of-box experience is essential with any new computer, and the 6400 takes this concept to new levels. On start-up, you'll notice a deep, loud tone, courtesy of a meaty speaker in the bottom of the 6400's chassis. If you attach external speakers, the internal speaker acts as a subwoofer, capturing bass tones while sending high tones out to the external pair. It's the best sound I've ever heard coming directly from a computer.

After the extensions march across the screen, you're greeted by a friendly video guide who takes you through your new Mac's features, including mouse skills, online registration, and a Mac OS tutorial. The guide's delivery is excellent and communicates Mac basics well to a wide variety of users.

### Full of Surprises

The first goodie I tried was the telephone, though my previous experiences with computer-based speakerphones had yielded lukewarm results and my expectations were low. When I explained to the person I called that I was using my computer as a phone, he was quite surprised and said my voice sounded clear and loud. The software responsible is Megaphone, a great little telephony application that includes voice-mail features.

Next, I got up and running on the Internet, surfing the Web in a matter of minutes, thanks to the Apple Internet Connection Kit. In conjunction with the the Performa 6400's release, Apple has launched My Home Page (*http://www.myhome.apple.com*), a handy stepping-off point for new users and old pros alike.

And the list goes on. The Performa 6400 comes with an impressive list of software titles for use in everything from writing your memoirs to creating and publishing your own Web page. For a complete list, check out *http://product.info.apple.com/productinfo*.

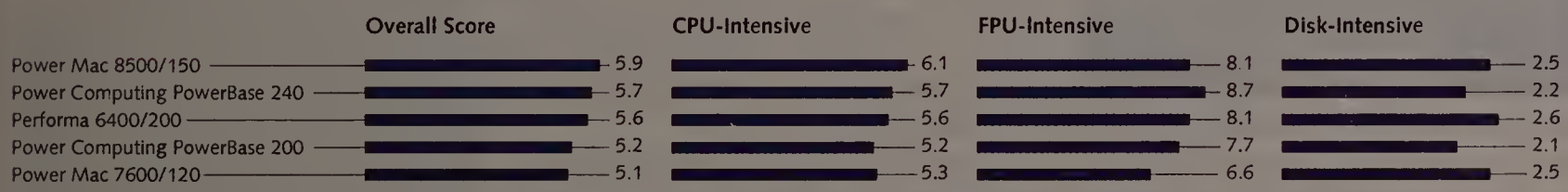
### The Last Word

The Performa 6400 is full-featured, zippy, and fun. I just wish it were cheaper. In the supercompetitive SOHO market its price represents a significant investment for those on a tight budget, especially when Windows-based home machines offer similar features at a lower price. Apple has done its job in creating a home computer that is truly delightful. The task at hand is convincing consumers to pay a little extra for that delight.—MATT CLARK

**RATING:** ★★★★/7.0 **PROS:** Lots of power; lots of software; lots of fun. **CONS:** A bit pricey. **COMPANY:** Apple Computer (408/996-1010, *http://www.apple.com*). **LIST PRICE:** $2799.

## Performa 6400/200 Stacks Up Nicely

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed in decreasing order of overall performance.




For more information on our tests, see "The New Speed Champs," *Macworld*, July 1996. —Macworld Lab testing supervised by Mark Hurlow

# YoYo 1.2

## TELEPHONY DOESN'T HAVE TO BE TRICKY—OR BORING

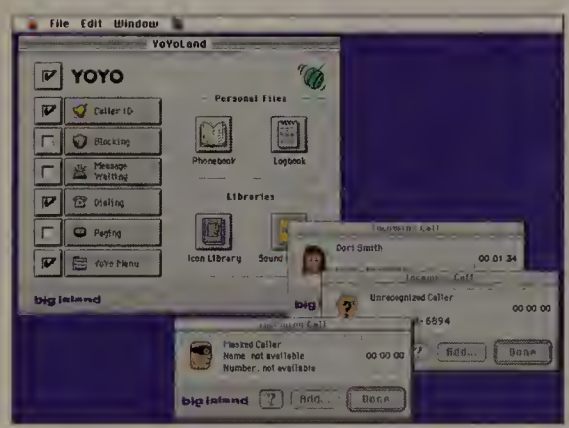
BIG ISLAND'S YOYO 1.2 IS SOMEthing new—a hardware-and-software combination that connects to your phone and your Mac. With the YoYo, you can screen and log your calls, dial the phone, and even have your Mac page you when you're away from the phone (see "Your Mac Is Ringing," elsewhere in this issue). For small-office or home-office users in particular, YoYo is an amazing productivity tool.

### Who's on the Phone?

The YoYo requires the phone company's Caller ID, a service that lets you know who's calling before you pick up the phone. Between the first and second rings, the phone company transmits the caller's phone number—and in some parts of the country, the caller's name—to the YoYo hardware, which passes it on to the YoYoLand software running on your Mac. The YoYo attempts to identify the caller by matching the Caller ID information with an entry in the built-in phone book. If the phone book recognizes the caller, a small window pops up on your screen with a name and phone number; otherwise, the window shows the phone number and the legend "Unrecognized Caller." People who have blocked their Caller ID information appear as "Masked Caller."

Another handy call-screening feature lets you associate each type of caller with a sound and an icon—one for people you know, another for unknown callers, and a third for masked callers. The program comes with a library of icons and sounds you can assign to anyone in your phone book; I've set up mine so that when my girlfriend calls, a sultry voice coos, "Hi, honey." The software also logs each call, saving the caller's name and number, the date, the time and duration of the call, and the status (incoming or outgoing). When your Mac is off, the YoYo stores the ID information and dumps it into the log the next time you boot up.

ARNOLD TIOSEJO




**Cool Phone Tricks** The YoYoLand software's clean design makes it easy to use. The three smaller windows show what appears on your screen when you receive calls from a recognized caller, an unknown caller, and a masked caller.

If you're out of the office, the YoYo can send the caller's name and number to your alphanumeric pager. If you have a numeric-only pager, you'll get the caller's number plus a configurable two-digit code letting you know the page came from the YoYo. In either case, you can specify that all calls, or only those from callers on a VIP list, go to your pager.

### I Vant to Be Alone!

When you don't want to take any calls, you can set the YoYo's call-blocking feature. Your phone won't ring, but your answering machine or voice mail will still pick up, and the YoYo will still log the call. You can specify that some callers always be blocked (perfect for those annoying relatives) and others never be blocked; you can even block calls from certain area codes and prefixes or during certain hours. Because the call-blocking lists are stored in the YoYo hardware, blocking works even when the computer is turned off.

The YoYo also works as a telephone speed dialer—you simply assign a hot key to bring up a list displaying the contents of the phone book. If you subscribe to your phone company's voice-mail service, a flashing light on the YoYo tells you when you have messages waiting. Unfortunately, the YoYo doesn't allow you to use a calling card; Big Island says this feature is slated for a future release.

The YoYo hardware hooks up in a flash, connecting to the Mac via the ADB port. On the back of the YoYo are two standard telephone jacks, one for your telephone and the other for your answering machine or wall jack. The current hardware only works with one phone line, which hardly seems enough in today's world. The YoYo works fine with Centrex systems but may be incompatible with PBXs, especially older ones, that can't transmit the Caller ID data.

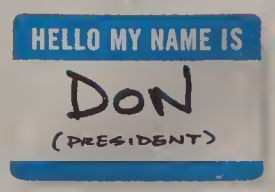
If you prefer to use your own personal information manager instead of YoYo's phone book, the included sample AppleScripts let you send the Caller ID information to Now Software's Now Contact or TouchBase Pro, Symantec's ACT, or Claris's FileMaker Pro, which then looks up the caller and displays that record. The combination of a good PIM and the YoYo is terrific because it makes all your data on a caller—including name, personal information, notes from previous calls, and reminders of events you have planned with the caller—instantly available when you answer the phone. You'll probably have to tweak the supplied scripts a bit, though; they create a new record whenever there is no match for the Caller ID, resulting in new records for wrong numbers and telemarketers.

### The Last Word

The YoYo makes the long-promised computer telephony a reality on the Mac. I was surprised to discover how advantageous it is to see who's calling; I'm better prepared when clients call, and it's easier to screen my calls when I'm working and don't want to be disturbed. If you're like me and have to juggle lots of telephone calls, the YoYo is a winner.—TOM NEGRINO

**RATING:** ★★★★/8.0 **PROS:** Innovative; well-designed software; excellent call-management features; works well with selected PIMs. **CONS:** No support for calling cards; can handle only one phone line. **COMPANY:** Big Island (408/342-8300, *http://www.big-island.com*). **LIST PRICE:** $149.

# *The right tool for the job!*

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# Phaser 350

## THE LATEST TEKTRONIX SOLID-INK PRINTER DELIVERS LASER-QUALITY OUTPUT

THE HOTTEST FEATURE OF THE Tektronix Phaser 350 solid-ink printer isn't its zippy print engine, vibrant color output, or bundled printer-management software; it's the unlimited supply of black ink that Tektronix is providing free.

The free black ink is more than a promotional gimmick; it's part of Tektronix's marketing plan to boost the appeal of its newest solid-ink printer to users who require a workgroup printer that can handle both color and monochrome jobs. The idea is that with the black ink supplied free, you can afford to use the 350 for all your office printing—not just the fancy color jobs. (Tektronix is also offering the free ink to users of the Phaser 340, the 350's predecessor.)

Even without the free ink, though, the Phaser 350 is a compelling printer. It has a compact design, a relatively speedy 6-pages-per-minute print engine, and solid-ink technology that delivers rich colors on standard office paper. The print quality is far superior to that of earlier Tektronix solid-ink printers, such as the Phaser 300 PXi. Amazingly, the 350 produces color output that rivals that of color laser printers—yet it costs at least $1500 less than even the least expensive color laser. Consumables—in the form of color ink sticks at $99 for a package of three—are also less expensive than color laser toner cartridges, which can cost more than $200 each.

The 350 is easy to set up, with clearly marked components that pop neatly into place. The slots for loading the ink sticks are easy to access and are color- and shape-coded, making it impossible to drop ink sticks into the wrong slots. The front control panel is a bright, two-line LED display with a straightforward menu

ARNOLD TIOSEJO

structure that makes it easy to configure the printer, activate internal cleaning operations, and print test pages. The 350 is equipped with a SCSI port and a parallel port; optional Ethernet, Token Ring, and LocalTalk interfaces are available.

The printer operates in three modes: Fast Color, Standard, and Enhanced. The Standard mode, at 300 dpi and about 4 ppm, is fine for most jobs, producing deeply saturated colors and text that is clean and smooth, though not razor sharp. The Fast Color mode, intended for quick proofing jobs, allows the 350 to print up to 6 ppm, but with somewhat washed-out color, more dithering, and cruder-looking text. The Enhanced mode bumps the resolution up to 600 by 300, but requires at least 24MB of memory (the basic 350 ships with 8MB of RAM). The resolution enhancement produced the best results, of course, but the improvements were not always that noticeable compared with the Standard mode.

Because the 350 must first melt the solid ink sticks in order to print, the printer requires a relatively long warm-up—about 15 minutes. Once it's warmed up, though, it's pretty fast—for a color printer. In its Standard mode, on average the 350 printed a bit faster than a 600-dpi Tektronix 550 color laser printer. In our Adobe Photoshop tests, the two printers were neck and neck. However, the 350 was able to handle certain jobs faster than the laser printer. For example, the 350 printed an Adobe Illustrator file 16 percent faster than the 550, completing the job in 102 seconds instead of 122. And it cranked out an Adobe PageMaker newsletter in less than half the time of the 550, processing in 91 seconds what took the 550 just over 184 seconds.

### The Last Word

The Phaser 350 delivers what most users are looking for in a color laser printer—but at a much better price. Despite its 300-dpi print engine, it produces gorgeous color and acceptable text. If you don't require tabloid printing—the 350 can handle only letter- and A4-size stock—it's an excellent choice for cost-effective color printing.—JOSEPH SCHORR

**RATING:** ★★★★/7.9 **PROS:** Delivers richly saturated colors; free black-ink sticks. **CONS:** Accepts letter-size and A4 paper only; long warm-up time; needs frequent cleaning. **COMPANY:** Tektronix (503/682-7377, *http://www.tek.com*). **LIST PRICE:** $3495.

MW LAB

## Reasonable Speed for a Color Printer

Best result in test. All times are in seconds. Shorter bars are better.

| | | Illustration | Bitmap—Photoshop | Long Single-Font Report | Short Multi-font Memo | Newsletter—PageMaker | Spreadsheet |
|---|---|---|---|---|---|---|---|
| Tektronix Phaser 350 | 300 dpi (Fast Color) | 97 | 254 | 220 | 37 | 78 | 44 |
| | 300 dpi (Standard) | 102 | 267 | 314 | 47 | 91 | 55 |
| | 600 × 300 dpi (Enhanced) | 160 | 308 | 654 | 82 | 154 | 92 |
| Tektronix Phaser 550 | 600 dpi (Standard) | 122 | 260 | 189 | 99 | 184 | 119 |
| | 1200 dpi (Premium) | 446 | 450 | 429 | 184 | 372 | 177 |

### Behind Our Tests

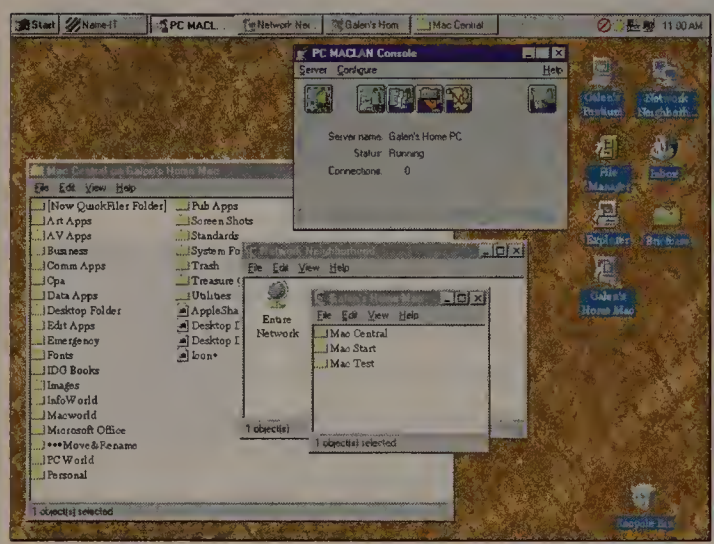
All tests were performed on a Power Mac 7100/80 with 24MB of RAM running System 7.5.3. Printers were connected via the Ethernet port. For more information, see "Color Laser Values," in this issue.—**Macworld Lab testing supervised by Jeff Sacilotto**

# AppleTalk for Windows 95

## FINALLY, NEAR-SEAMLESS CROSS-PLATFORM NETWORKING

EIGHT MONTHS AGO, THE FIRST AppleTalk networking software for Windows 95 was a disappointment (see *Reviews*, March 1996). The two products—Miramar Systems' Personal MacLAN Connect 5.5 and CoOperative Printing Solutions' COPSTalk 1.2—didn't integrate fully into the Windows 95 networking architecture, and they didn't support Windows 95's new, 250-character file names.

That's changed. Both programs have been revised, and both now offer near-seamless integration with Windows 95.




**Mac Masquerade** With COPSTalk 2.0 and PC MacLAN 6.0, your Macintosh's files, printers, and folders work like those on any networked PC from Windows 95. PC MacLAN adds a file-server control panel (at top) that lets the Macintosh use the PC's files, printers, and folders as well.

PC MacLAN 6.0 (Miramar has renamed the product) and COPSTalk 2.0 behave as they should: almost invisibly. Once installed, both give you full access from a Windows 95 PC to any Mac (or PC running AppleTalk) through the Windows 95 Network Neighborhood (a desktop for networked devices and servers) and through programs' Open and Save dialog boxes. As far as Windows 95 is concerned, a Mac running PC MacLAN or COPSTalk is no different from, say, a PC connected via TCP/IP or NetBEUI.

(If you buy COPSTalk, be sure to get the version 2 updater, available on the COPS Web page, if your PC or network card uses an AMD chip set. COPSTalk can crash your system because of a conflict with that popular chip set. Use the Windows 95 Network control panel to see what chip set you have.)

Both PC MacLAN and COPSTalk offer only rudimentary extension maps, which allow the correct Mac icon to appear in Windows (such as an Adobe PageMaker icon for a PageMaker file). The programs automatically set up a few common mappings, but there are no lists of others in the manuals or online help. It would be much better if you could click on a Mac file to get its file and creator types, and then add the PC extension. While both programs include an editor to add and modify file maps, they rely on you to figure out the Mac file and creator types—something the Mac OS doesn't reveal.

### The Big Difference

Both products are equally well integrated with Windows 95, and both let a PC run as an AppleTalk client. So why choose one over the other? PC MacLAN 6.0 also lets a PC act as a file server to Macintoshes (and AppleTalk-based PCs), allowing client Macs to see its drives and printers. Because COPSTalk 2.0 is just a client, it lets the PC see Mac devices but not vice versa.

PC MacLAN 6.0's integration with Windows 95 comes in handy for using the server. PC MacLAN 6.0 integrates itself into the Windows 95 context menus, which display only relevant actions when you right-click on a device or file. Using PC MacLAN 6.0, the context menu for a drive (fixed or removable) lets you turn file-sharing for that device on or off, as well as to launch the PC MacLAN server. This helps make PC MacLAN truly an integral part of your Window 95 environment.

The previous version of PC MacLAN's server software worked capably, and the changes are minimal. You can now configure the file server to start automatically when Windows 95 starts. (Unfortunately, the manual's directions to do this are unnecessarily difficult. It's easier to put an alias of the server icon in the StartUp folder, right-click the icon, enter the Properties menu, and add a space and then **-s** to the end of the Shortcut Target's command line.)

PC MacLAN's configuration of the file server could also stand improvement. If you turn on the file server, you'll find your performance throughout Windows 95 slowing to a crawl—you'll go crazy trying to work like that. The culprit is the default polling time for the file server: it polls the network constantly, giving Windows 95 and your programs minimal resources. The fix is complicated and not well documented in the manual. (You can find full directions on Macworld Online, *http://www.macworld.com/pages/november.96/extras/windows.html*.) The file-server control panel should let you change this value directly, rather than force you to edit the innards of the Windows 95 registry file (the equivalent of using ResEdit on the Mac).

### The Last Word

Both COPSTalk 2.0 and PC MacLAN 6.0 work well—once they're set up, you'll forget they're there. That's great news. For peer-to-peer cross-platform networking, where both Macs and PCs can see each other's files and printers, PC MacLAN 6.0 is the only choice. But if you're mainly a PC user who only needs access to a Mac server, COPSTalk 2.0 does do the trick for less.—GALEN GRUMAN

### COPSTalk 2.0 for Windows 95

**RATING:** ★★★/6.8 **PROS:** Gives PCs running Windows 95 native access to Mac files, printers, and folders. **CONS:** Expensive; does not let Macs work with PC files, printers, or folders. **COMPANY:** CoOperative Printing Solutions (770/840-0810, *http://www.copstalk.com*). **LIST PRICE:** $159 (single user).

### PC MacLAN 6.0 for Windows 95

**RATING:** ★★★★/7.5 **PROS:** Lets PC users use Mac files, printers, and folders as standard Windows 95 resources, plus lets Macs use Windows 95 files, printers, and folders. **CONS:** Does not provide easy file-extension mapping; has some unnecessarily difficult configuration requirements. **COMPANY:** Miramar Systems (805/966-2432, *http://www.miramarsys.com*). **LIST PRICE:** $199 (single user).

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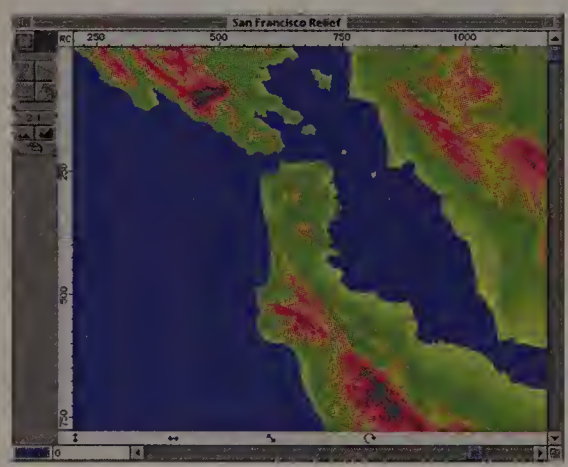
# Map Factory

## UNIQUE RASTER-BASED MAPPING PROGRAM

THE DOMINANT GEOGRAPHIC INformation System (GIS) programs for the Macintosh, ESRI's ArcView and Map Info's MapInfo, use a vector-data model, which represents geographic features as points, lines, or polygons. Both are limited to the static viewing of raster data, where a fine grid is laid over the landscape, dividing it into a large number of evenly spaced cells with each cell accorded its own value.

ThinkSpace's Map Factory, a new entry in the GIS market, focuses exclusively on the raster-data model. While its overall capabilities are not as broad as ArcView's or MapInfo's, Map Factory provides a rich set of functions for creating, editing, analyzing, and presenting raster data. Researchers, educators, and planners interested in landscape analysis should take a particularly close look at Map Factory.

In a vector-based GIS, each geographic feature is associated with a record in a data table. This approach is most appropriate for discrete geographic features, such as school sites (points), streets (lines), or cities (polygons). However, many types of geographic data are continuous rather than discrete; for example, soil composition, elevation, and precipitation do not change abruptly, but instead vary gradually over space. A raster-based GIS most effectively portrays such data types. The hundreds or thousands of cells that represent a landscape allow for complex spatial variation, similar to the role pixels play in a digital photograph.




**The San Francisco Bay** Map Factory is great for working with digital elevation models.

### First, Make a Map

The first step in using Map Factory is to create a map. One common source of raster data is scanned images of paper maps—particularly the topographic sheets published by the United States Geographic Survey. While Map Factory provides a set of simple tools for manually tracing line and area features, this is a tedious process. Fortunately, users can avoid most tracing by using Map Factory's translators to import data from digital images (such as satellite pictures and aerial photographs) and other mapping applications. Several translators convert vector data to raster form, allowing it to be used in Map Factory.

One key source of raster data is the USGS's archive of Digital Elevation Models, available free over the Internet. Map Factory provides only a rudimentary mechanism for registering maps to Earth's surface, so for the greatest accuracy all data sources should be in the same map projection.

Once you create a map, Map Factory shines in its display and analysis functions. A legend window summarizing cell values accompanies each open map window. A magnifying-lens tool is available to highlight individual pixel values, which is handy when the legend contains numerous unique values.

Users can select value ranges and apply graduated color sequences, or change the colors that correspond to individual values. Unlike other GIS programs' muddied or pixelated color sequences, those in Map Factory are bright and distinct. Unfortunately, the interface for changing colors is a somewhat cumbersome dialog box that you must open and close for each change. A floating palette would be much easier to use.

### Analyzing Maps

One of the most important advantages of Map Factory's raster-data model is the relative ease and speed of analytical operations. Map Factory includes about 20 such operations, along with a full suite of mathematical functions and operators for working with cell-value matrices. Spread, for example, is a sophisticated tool for creating variable buffers depending on elevation or any other factor, for use in everything from analyzing flood zones to modeling the dissipation of pollutants through groundwater. The Clump feature aggregates cells of similar types within a specified distance, allowing for, say, the examination of forest patches and clearings. To conduct your analyses, you build statements in a nicely designed script editor, complete with drop-down menus for inserting the proper syntax. Each operation draws on one or more source maps to create a new result map.

Once analysis is complete, you can use Map Factory's layout facilities to place a map on a page along with elements such as a title, legend key, scale bar, and north arrow. Creating attractive presentation maps to suit one's taste is easy. One particularly nice formatting feature is the ability to create gradational scales for continuous data such as elevation.

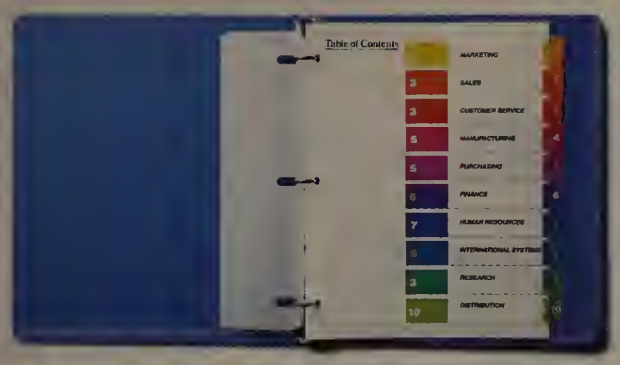
Map Factory is admirably conservative with system resources, requiring as little as 3MB of permanent hard drive space and 1.5MB of RAM to run comfortably on a Power Mac. The program is not a speed demon, and analytic operations can take several minutes to complete, depending on the data's size and operation's complexity. Once the results are ready, though, drawing to the screen is always reasonably quick.

The printed manuals accompanying Map Factory are lucidly written, well organized, and full of practical examples. In addition to the *User Guide* and *Module Reference* describing the program's functionality, Map Factory includes an excellent 200-page tutorial that steps through the entire process of creating, displaying, analyzing, and presenting a map.

### The Last Word

Map Factory is no substitute for high-end GIS programs, nor for common desktop mapping programs. But it's unique for the functionality it brings to the Mac. Users who need to do landscape analysis, particularly those who need to teach others about GIS, may find it a useful addition to their toolboxes.—KARL GOLDSTEIN

**RATING:** ★★★/6.3 **PROS:** Robust raster-analysis tools. **CONS:** Not a complete GIS solution. **COMPANY:** ThinkSpace (519/858-5047, *http://www.thinkspace.com*). **LIST PRICE:** $996.

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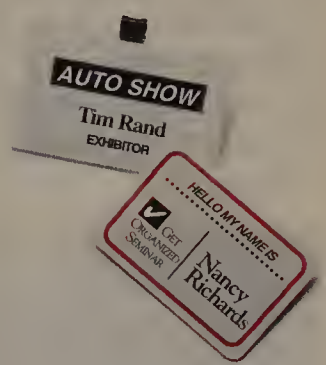


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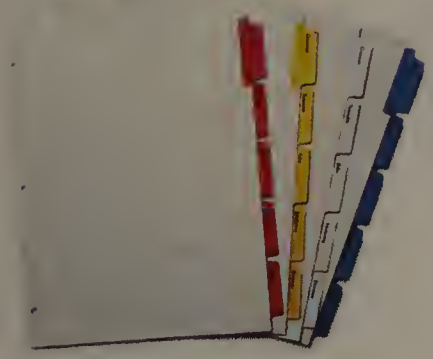

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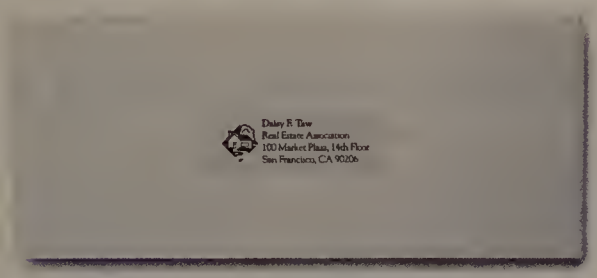

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# Three-Piece Speaker Systems

DO THREE SPEAKERS REALLY GIVE YOU BETTER SOUND THAN TWO?

AS I WROTE IN MY RECENT SURVEY of computer speaker systems, a three-piece computer speaker system with a dedicated woofer (some call it a subwoofer) should offer better-quality bass, but some models just don't deliver (see "Multimedia Speakers," *Buyers' Tools*, March 1996). In this comparison, Yamaha improves upon an older model, but Midi Land's system is subpar.

SUZANNE ROADY

The Yamaha System 45 (left) and the Midi Land S35/818 System

### Midi Land S35/818

The Midi Land S35/818 System has two sets of controls. You'll find a standard power switch, volume and tone controls, and a headphone jack on the right-hand satellite unit. The subwoofer has an additional set of controls and jacks on a small, separate module. This control unit has its own system volume control, a level control for the woofer, a control to set the frequency at which the woofer takes over (although it offers no visual indication of what you're setting), and a DSP switch that creates a 3-D sound effect. At the rear of the module is a phase-smoother switch that's supposed to provide clearer reproduction of low frequencies (I didn't notice much difference), plus various input jacks. You can connect two sources and a mike.

Midi Land claims that its Mli-S35 subwoofer goes down to 35Hz, which is a pretty low frequency limit for a small speaker. But a quick run with a test CD showed that very little was audible once you got below 60Hz. For most musical material that's probably adequate. The bass, however, had a thumpy, boomy quality, and the all-important midrange, where most musical material lies, sounded rather harsh. Neither voices nor music excelled with this product. The DSP circuitry extended the sound stage of CD games but simply made music CDs sound more distorted than they were already.

The manuals for both the satellites and the subwoofer are bare-bones affairs, just four pages each. The system's functions are illustrated, but there is no advice on how to fine-tune the satellite units and subwoofer for best performance. The manual shows the phase switching, 3-D effects, and subwoofer frequency adjustment controls, but doesn't tell you how and when to use them.

### Yamaha System 45

Yamaha's System 45 mates a new product with an older one. The YST-M15 multimedia speaker system (available separately for $99.95) is new, while the subwoofer component, the YST-MSW-10, was examined as part of the YST-SS1010 system in the "Multimedia Speakers" article. This subwoofer is an OK speaker, with good bass and a listenable but slightly smeared sound quality.

The Yamaha's controls are straightforward. The right-hand satellite unit has basic power, volume, and tone controls and a headphone jack at the front. Output to the subwoofer, and separate inputs for your Mac and (for example) a CD player, are found at the rear. The subwoofer has a two-position switch to select the frequency at which it takes over, plus a level control and power switch.

The all-too-brief manual is multilingual, offering confusing setup illustrations with captions in seven languages. As with the Midi Land speaker system, you get no advice on adjusting the volume level or placing the subwoofer module.

When it came to sound, the Yamaha System 45 fared rather well. The sound was reasonably crisp and clean, and bass notes sounded strong but not boomy. While the floor didn't shake, I got usable bass down to around 50Hz. The system played loudly enough for a small room, but don't expect miracles.

All told, though, the System 45 didn't quite come up to the level of the top-rated product in this category, the Acoustimass Multimedia system from Bose. However, it also costs less than half as much.

### The Last Word

When it comes to features, both systems have the right stuff. But sound is where it's at, and the Midi Land system fares poorly in its sonic attributes. In contrast, Yamaha's System 45 is a step up from its predecessor, giving you decent sound at a decent price. It's worth a listen, but don't expect it to be a match for a good-quality conventional home stereo.—GENE STEINBERG

### Midi Land S35/818 System

**RATING:** ★★/3.1 **PROS:** Easy setup; second audio input for external CD drive. **CONS:** Mediocre sound quality; 3-D sound feature distorts music CDs; poor manuals; lacks instructions on fine-tuning woofer module. **COMPANY:** Midi Land (909/592-1168). **LIST PRICE:** 818 desktop speaker $79.95, S35 subwoofer $239.95.

### Yamaha System 45

**RATING:** ★★★★/7.1 **PROS:** Decent sound; easy setup; has second audio input for external CD drive. **CONS:** Barely adequate manual; lacks instructions on fine-tuning woofer module. **COMPANY:** Yamaha (714/522-9240, *http://www.yamaha.com*). **PRICE:** $249.95.

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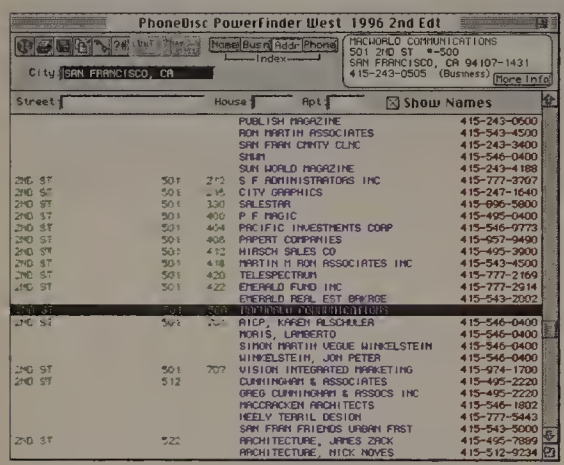
# Telephone Directories on CD-ROM

PRODUCTS RANGE FROM RINGING OFF THE HOOK TO WRONG NUMBER

AT FIRST GLANCE, THREE NEW telephone directories on CD-ROM—PhoneDisc PowerFinder, Phone Search USA, and Select Phone—are similar, but putting them through their paces made it clear they're not created equal.

### Variations on a Theme

The CDs contain the numbers and addresses of businesses and residences in the United States. All three split their data over geographically segmented discs. PhoneDisc PowerFinder and Select Phone each have 6 discs, but PhoneDisc claims 112 million listings while Select Phone has 100 million. Phone Search USA pulls up the rear with only 80 million listings on 3 discs.




**Less Than Complementary Color** PhoneDisc can show the neighbors of a given record, but its color scheme makes some information hard to read.

To test the products, I exported records from my contact manager. Then I searched the programs, starting with a name and city. If that failed, I attempted a reverse search on the phone number. I judged responses as correct, partially correct, or missing entirely.

In my tests, Select Phone, though far from perfect, appeared to be the most accurate: 53 percent of its responses were correct, compared with 44 percent for PhoneDisc and only 37 percent for Phone Search USA. Furthermore, it failed to locate records only 25 percent of the time, whereas PhoneDisc struck out with 34 percent, and Phone Search USA came up empty with 40 percent.

In Phone Search USA and Select Phone, you type your criteria into the search window and press return, and your results appear almost immediately, although complicated searches can take minutes in Phone Search USA. In PhoneDisc, as you type your search criteria the scroll box instantly fills with the nearest matches. This fast response beats the other two programs'.

### One by One

Phone Search USA has the simplest design and offers the most basic features. It lets you add records to a selection for later exporting and printing—particularly useful when compiling records from multiple discs. Phone Search USA was originally developed for Windows, a fact that's obvious when you consider its many un-Mac-like ways. For example, switching from one disc to another is needlessly complicated, and the program completely lacks menus (there's not even a Quit command).

Select Phone most closely resembles a Mac program. Its SmartFind feature displays records that are close to your specifications—great when you're not certain of spelling or location. Also helpful, especially for compiling marketing lists, is the ListMagic feature, which selects only records that meet certain qualifications. The unique GeoTarget feature searches for records within a certain distance of a location, or for a given number of records near a location. Another practical feature lets you view records that are close to a selected item, either geographically or alphanumerically. Select Phone's only disappointments are that searching across discs is a pain, and switching discs is too complicated.

PhoneDisc has some unfortunate interface problems. For example, the selection bar in the search-results window obscures the data it's supposed to highlight. You can't use shift-tab to move to previous fields in dialog boxes. And PhoneDisc can't tag records for easy collection into a single file.

Still, PhoneDisc offers enough powerful features that I can forgive these flaws. You can narrow searches by entering additional information that must match. PhoneDisc allows you to see a listing's neighbors, but instead of displaying just one street, you can scroll to see other streets in the same town, or towns with similar names. The Try Harder feature, which looks for similarly spelled names, is also nice.

### The Last Word

Given its poor reliability and bare-bones feature set, there are only two reasons to consider Phone Search USA: its low price and its unique ability to be used in conjunction with DeLorme's Street Atlas USA 3.0 (also reviewed in this issue). Deciding between PhoneDisc and Select Phone is a little more difficult. While I like the instant response and easy disc switching of PhoneDisc, Select Phone is somewhat more reliable and has a few very useful features, most notably GeoTarget, that PhoneDisc doesn't offer. Top it off with a nice Mac interface, and Select Phone edges out PhoneDisc.—OWEN W. LINZMAYER

### PhoneDisc PowerFinder 2.2

**RATING:** ★★★★/7.2 **PROS:** Most listings; instant response; quarterly updates, with one free. **CONS:** Non-Mac interface; compiling lists is difficult. **COMPANY:** Digital Directory Assistance (301/657-8548, *http://www.dda-inc.com*). **LIST PRICE:** $129, quarterly updates $79.

### Phone Search USA 2.0

**RATING:** ★★/3.0 **PROS:** Compiling lists is easy; inexpensive; works with Street Atlas USA. **CONS:** Fewest listings; least accurate; bare-bones features; no regular updates available. **COMPANY:** DeLorme Mapping (207/865-1234, *http://www.delorme.com*). **LIST PRICE:** $49.

### Select Phone 4.0

**RATING:** ★★★★/7.2 **PROS:** Most accurate and Mac-like; many useful, unique features; quarterly updates are available. **CONS:** Switching discs is difficult; updates are expensive. **COMPANY:** Pro CD (508/750-0055, *http://www.procd.com*). **LIST PRICE:** $99, quarterly updates $89.

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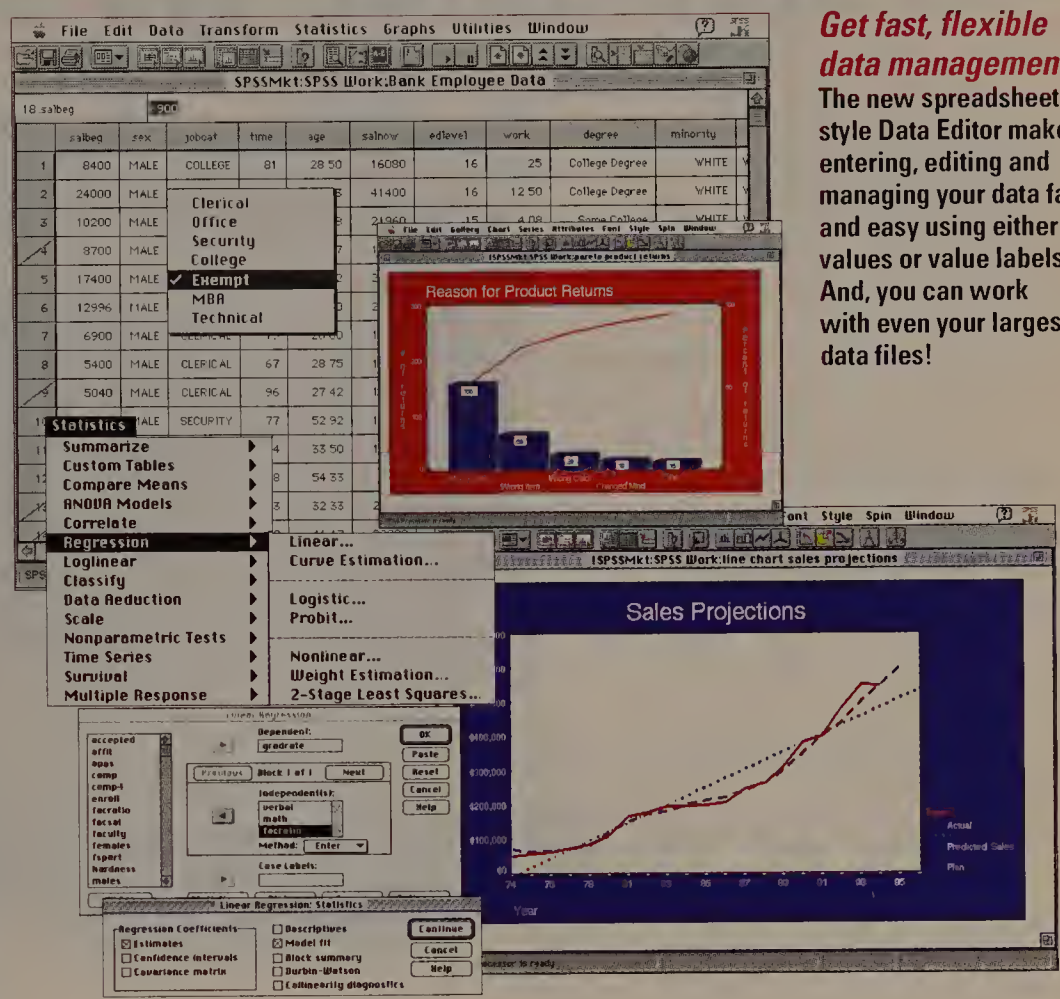


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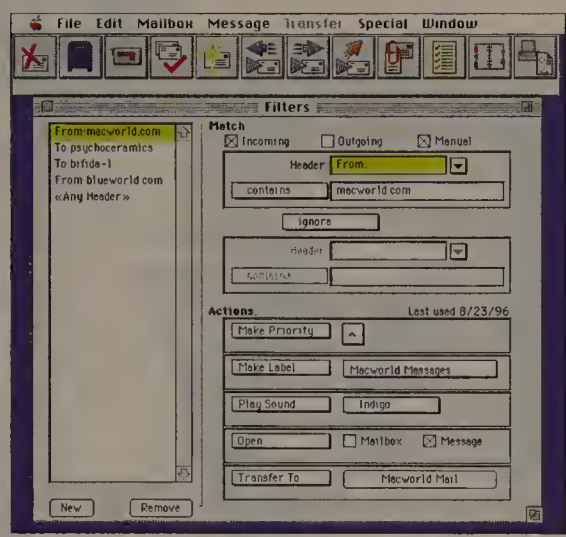
# Eudora Pro 3.0

INTERNET E-MAIL READER IMPROVES, BUT NOT BY MUCH

EUDORA HAS BEEN THE BENCHmark in Internet E-mail since its release as freeware several years ago, but it was starting to show its age when Claris Emailer arrived last year and offered some much-needed competition. The commercial release of Eudora Pro 3.0 smooths out the rough edges of the program's interface, improves mail handling, and makes the program more convenient to use. It doesn't pioneer many new features, though; this feels more like a minor revision than a major upgrade.

Eudora Pro's most dramatic improvement lies in its mail filtering. This feature lets you apply a set of rules to incoming or outgoing mail; for example, I set up a filter that takes incoming mail from *macworld.com*, sets it to high priority, labels and colors it, plays a sound, and files the message in a special mailbox. You can create any number of filters, and you can even apply filters manually to any messages (Emailer's Mail Actions aren't as flexible as Eudora Pro's, and they filter mail only as it's received). Missing is the option to take action if the sender is (or is not) in the address book, a filter that's present in Emailer.

Eudora Pro relieves the stark user interface of its predecessors by adding a configurable tool bar with icons denoting the program's common commands. Still, the interface could be charitably described as no-nonsense (or, not so charitably, as just plain ugly). The address book is another improvement, but it's still vastly inferior to Claris Emailer's. Eudora requires a nickname for every address and forbids spaces or punctuation in the nickname. When you enter a partial nickname in the To field of a new message, Eudora won't complete the name unless you use a menu or keyboard command (Emailer guesses and completes the name as you type). Emailer can easily handle multiple E-mail accounts for an addressee, and while you're addressing the mail you can choose which account to send the message to; with Eudora you have to use a separate address-book entry. You can drag and drop addresses from Eudora's address book into a message, but you can't drag addresses from messages into the address book to create a new entry. And while the manual says you can create a mail group by selecting several addresses and using a menu command, repeated attempts to do this crashed my Mac.




**Filtering the Mail** Eudora Pro's mail filters let you slice and dice your mail according to rules you set up. Here, mail from *Macworld* gets the treatment.

One nice improvement is that Eudora Pro now colors and underlines URLs in messages, and ⌘-clicking on an URL launches the appropriate application. And Qualcomm has made several other small but welcome improvements: the program no longer slices messages larger than 32K into smaller messages; it now supports styled text in messages sent to mail clients that understand the "text/enriched" MIME standard (which, at the moment, means only other Eudora Pro users); the Find command has been enhanced, making it easier to search multiple mailboxes; you can now append any number of signatures to messages; and the program ships with Working Software's Spellswell 7, a spelling checker that works from within other applications.

### The Last Word

Eudora Pro is a very good Internet E-mail client, and longtime Eudora users should be happy with this upgrade. But in spite of the powerful mail filtering and improved interface, nothing here is compelling enough to tempt Claris Emailer users to switch.—TOM NEGRINO

**RATING:** ★★★/6.1 **PROS:** Improved mail filtering; better interface; highlights URLs. **CONS:** Buggy; poorly designed address book. **COMPANY:** Qualcomm (619/658-1200, *http://www.eudora.com*). **LIST PRICE:** $89.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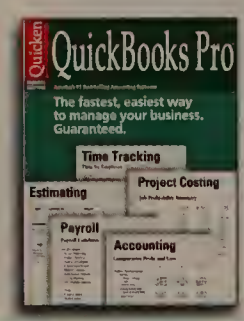


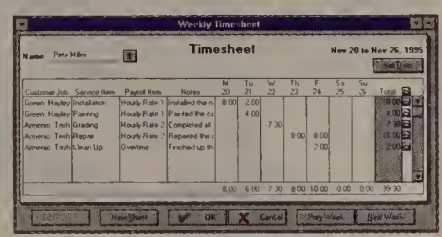


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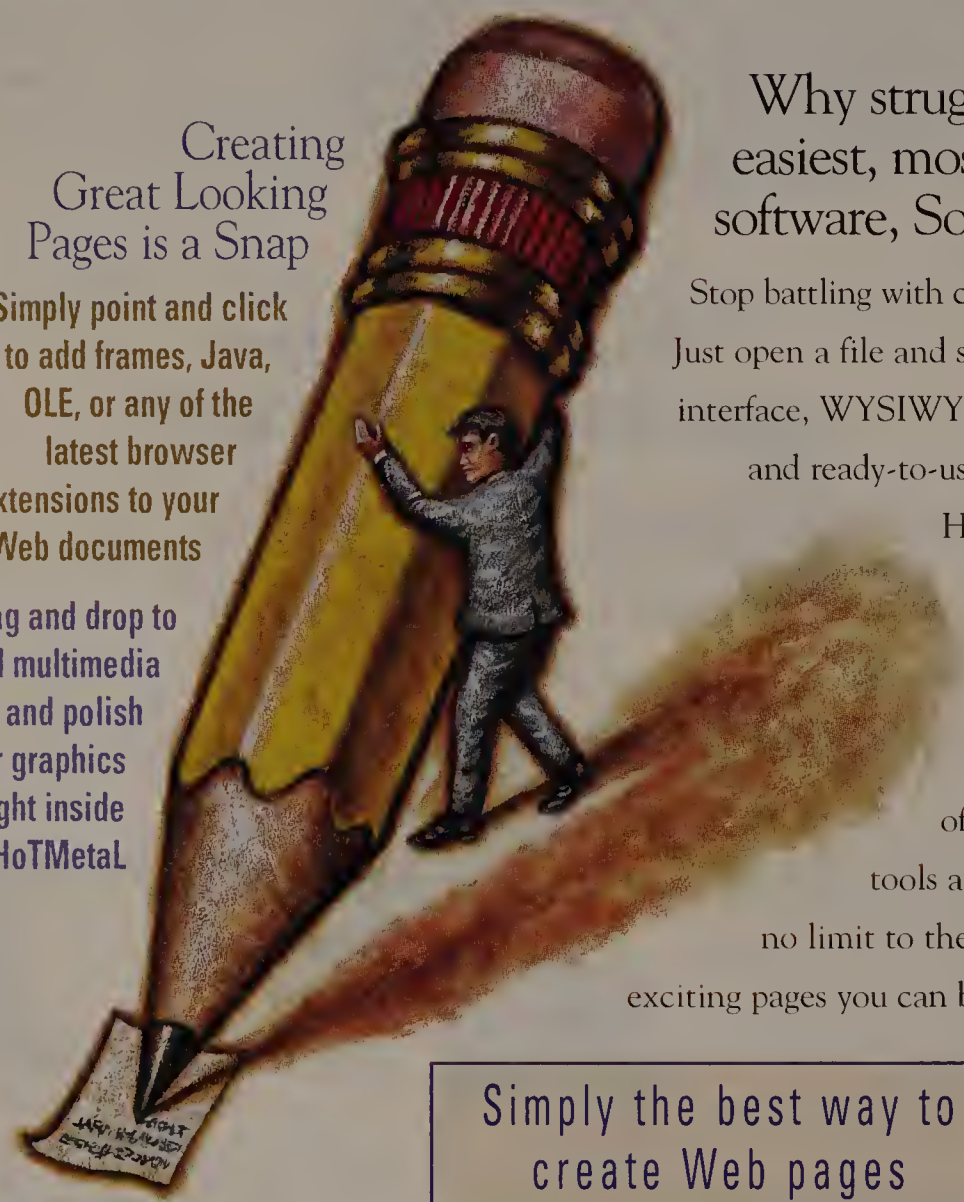

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**Circle 28 on reader service card**

# AirCommunicator Lite

CELLULAR FAX MODEM WITH FLAIR OFFERS A COMPLETE SOLUTION

MOST CELLULAR MODEMS REquire you to have your PowerBook turned on to receive a fax—not very convenient when you're running through an airport. The AirCommunicator Lite solves that problem by receiving and storing faxes while it's in your pocket. You can download the faxes into your PowerBook later. On top of this elegant bit of convenience engineering, the AirCommunicator doubles as a cellular phone, an answering machine, and a 14.4-Kbps modem.

The AirCommunicator package includes a cell phone and battery, desktop charger, serial cable, Mac and Windows software, and a user guide with a well-written Macintosh section. An optional Executive package adds a docking station that lets you run the AirCommunicator off AC power and use it as a 14.4-Kbps fax modem over regular phone lines. The Mac software consists of Smith Micro Software's MacComCenter fax and terminal-emulation package, and a set of scripts for Apple Remote Access (ARA).

The compact AirCommunicator phone is a little larger and heavier than the popular Motorola flip phone, but fits well in the hand and has an easy-to-read two-line backlit alphanumeric display. You can configure the AirCommunicator in stand-alone mode to receive and store faxes, to send stored faxes to a fax machine, and to operate as a digital answering machine. As shipped, the unit can hold about a half-dozen fax pages or two minutes of voice mail. The Executive model's memory-compression feature ups these limits to 37 pages and 16 minutes, respectively. A remote software-upgrade feature conveniently lets you download new software from Air Communications over the air, a feature I tested by downloading the memory-compression option.

When set up to receive faxes automatically, the AirCommunicator display tells you how many faxes have arrived. Alas, the fax counter shows only a single digit; when more than nine faxes are stored, the counter turns to an asterisk.

Once a fax is stored, you can send it to a fax machine (handy for paper copies) or your PowerBook. To transmit a fax to your PowerBook, you connect the AirCommunicator to the Mac's serial port. The Mac sees the incoming fax as a phone call and automatically receives it. You can then view or manipulate the fax just as if it had been received over a regular phone line. The fax software is rather generic but has all the features you need for faxing on the road, including cover sheets and a phone directory.

Air Communications touts its proprietary AirTrue cellular protocol, designed to ride out cell switches and brief signal outages. Indeed, I was able to maintain an Internet connection while traveling in a car all over Los Angeles, as long as I was able to first configure the remote end with the special AT commands documented in the user guide. However, because fax machines don't support these commands, faxing while moving works poorly.

### The Last Word

The AirCommunicator Lite is a wonderfully elegant solution to the problem of receiving faxes while traveling. That it includes a slew of other useful features—including well-thought-out Mac documentation and software—is icing on the cake. When combined with the optional docking station, it can be a complete PowerBook modem solution.—MEL BECKMAN

ROBERT PERRY

**RATING:** ★★★★/8.2 **PROS:** Stand-alone fax send and receive; integrated voice mail. **CONS:** 14.4-Kbps maximum data speed; single-digit fax counter. **COMPANY:** Air Communications (408/567-8000, *http://www.aircomm.com*). **COMPANY'S ESTIMATED PRICE:** $695.


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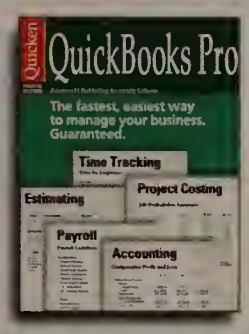


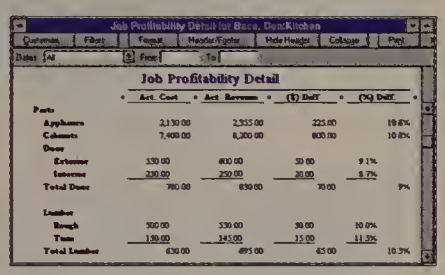


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# Internet Access Suites

CHAMELEONNFS AND TCPCONNECT4 OFFER TWO WAYS TO LINK MAC DESKTOPS

MANY MACINTOSH USERS ARE only dimly aware of servers based on the Network File System standard perhaps because the first NFS client-server setups were available only for Unix and Windows NT servers. But you may soon encounter URLs that begin with *nfs://* rather than *http://*, on a corporate intranet if not yet on the Internet. Because the NFS technology essentially makes any server—a Mac, Windows NT, or Unix system—look like just another hard drive on your desktop, it's a natural extension of the Mac interface. That's why it's disappointing that Apple didn't implement NFS as part of the system software.

Fortunately, two third parties have stepped in: InterCon with its NFS version of tcpConnect4, version 4.0 Enterprise; and NetManage with ChameleonNFS 3.6. Both provide standard Internet applications (FTP and Usenet clients, Gopher, E-mail, terminal software, and SLIP/PPP connections), along with support for Web browsers and HTML, but the philosophical and practical differences between the two are substantial.

These suites feature simple client software that lets network administrators manage security and other issues easily—tagging servers to appear at start-up, updating server lists, and associating different levels of security with different office groups. They work just like AppleShare, and they use the Chooser to let you select your NFS sites as if they were local physical network units.

That's where the similarities end. For one, Chameleon's origins as a Windows product are evident in the manual and the software itself. And Chameleon packs a large assortment of conveniences to help you work with Unix hosts, along with basic tools for HTML; tcpConnect4 doesn't do this, but it includes some special applications and a consistent icon bar across those programs.

The cloud hanging over both programs is dust from the Netscape-Microsoft browser race. FTP clients, efficient and trustworthy though they are, seem almost quaint compared with the FTP functions in Netscape Navigator 3.0. The old model of one application for E-mail, one for Gopher, one for Telnet, and so forth has receded before the forces of the Web and the current generation of megabrowsers. Neither Chameleon's WebSurfer nor tcpConnect4's browser—both clean, simple, and quick—can handle Java yet, so they'll need some updating. And while NetManage's terminal communications program is useful, fully programmable, and broadly configurable (the terminal software in tcpConnect4 is less powerful but significantly easier to configure and use), it's been a while since terminal programs—however powerful—were the focus of Internet or intranet development. The prices quoted here are for individual licenses, and per-station prices drop considerably for large sites, but these suites compete in an environment where browser software is free.

### The Last Word

With a disciplined programming and configuration effort, companies can use ChameleonNFS to build a fast, secure, multifunctional network that runs well on minimal Mac client hardware. The suite's individual components have little Web-style gee-whiz value, but they work well together, with no surprises. tcpConnect4's suite is simpler to install and use but is less feature-laden. The question hanging over both suites, though, is whether they're still worth considering if NFS support is dropped into the two big Web browsers.—CHARLES SEITER

### ChameleonNFS 3.6

**RATING:** ★★★/6.6 **PROS:** Good collection of small, fast applications. **CONS:** Some tools are ports of older Windows products. **COMPANY:** NetManage (408/973-7171, *http://www.netmanage.com*). **LIST PRICE:** $395 per user.

### tcpConnect4 4.0 Enterprise

**RATING:** ★★★/6.8 **PROS:** Designed for Mac; easy installation and setup; good integration. **CONS:** Individual apps cover just the basics. **COMPANY:** InterCon (703/709-5500, *http://www.intercon.com*). **LIST PRICE:** $495 per user.


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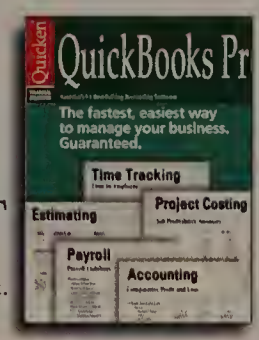


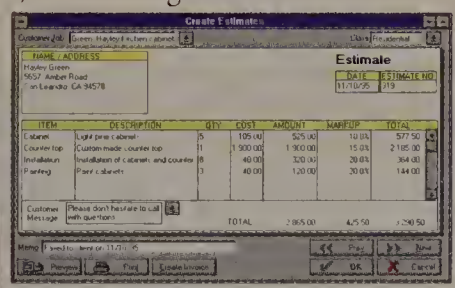


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**Circle 83 on reader service card**

# CyberGauge

NETWORK MONITORING FOR THE MASSES

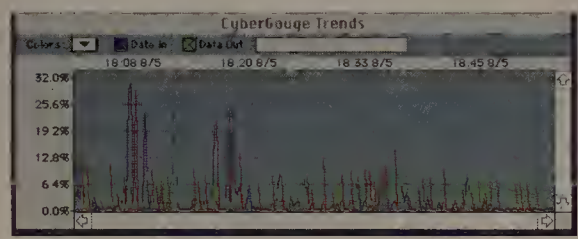
A ONE-TRICK PONY ISN'T A BAD deal if its trick is a useful one, for a reasonable price. Neon Software's CyberGauge does one fine trick—monitoring network-bandwidth use—with flair and aplomb, and at a price that makes it an easy buy. Ordinary folks buying Internet access or sharing router connections will find CyberGauge useful for checking that providers and other users are living up to their performance promises. And network administrators will find it a convenient tool for on-the-spot measurements and problem diagnosis.

CyberGauge uses the Simple Network Management Protocol (SNMP) to monitor data traffic in a single network device. It graphs the traffic as a percentage of total available bandwidth, giving you a colorful picture of the device's workload over time. Because CyberGauge monitors a single device, it doesn't need a dedicated Ethernet port as protocol analyzers require. And because its job is much simpler than that of high-end analyzers, you don't need to read a fat manual or understand network protocols to find CyberGauge useful.

Upon launching, CyberGauge displays an intuitive three-window interface. Once you select the device to monitor by typing in its IP address or name, CyberGauge queries the device and displays information about it and its interfaces. You then select the interface (such as Ethernet or serial) you want to monitor and click on the Begin button; CyberGauge starts graphing the device's bandwidth use in its Trends window. At the same time, CyberGauge continuously tracks the minimum, maximum, average, and current use for both input to and output from the monitored interface. Moving the cursor over a graph line displays the exact measurements at that point.

CyberGauge has intelligent defaults for all its configurable parameters—interface speed, SNMP community name, monitoring interval, and SNMP timeout—but you can fine-tune these if necessary. You can also opt to have CyberGauge display raw bits-per-second values rather than bandwidth use. You can print any window—useful for documenting problem situations—and optionally log collected statistics to disk. CyberGauge stores up to several days' worth of measurements on disk and can replay them as needed or export them to a tab-delimited file for spreadsheet analysis. Saving a particular device configuration as a CyberGauge document in your Startup Items folder lets you automatically start monitoring when you restart.

Because virtually all modern network devices, including Mac CPUs, are SNMP-capable, you'll likely have no trouble finding devices to monitor on your LAN. Which device you choose depends on what you're trying to measure. For example, monitoring your Internet router can tell you whether you're getting the bandwidth you're paying for; monitoring an AppleTalk server can warn you when it's time to split the server's load across two or more machines. The ubiquity of measurable devices brings out the one annoying flaw in CyberGauge: it can monitor only one device, and only one interface on that device, at a time. I found an undocumented work-around for this—create multiple copies of the CyberGauge application and run them simultaneously—but this is inconvenient, to say the least.




**Not for Gurus Only** CyberGauge gives you a graph of usage trends.

### The Last Word

Until CyberGauge, bandwidth monitoring was the domain of Internet gurus and network administrators—the only people who could justify the expense and education required to use full-blown network-management tools. By making bandwidth monitoring intuitive and easy, CyberGauge brings one key aspect of network management to the masses.—MEL BECKMAN

**RATING:** ★★★★/8.0 **PROS:** Inexpensive; easy to use; data capture with export capability; prints any window. **CONS:** Monitors only one device at a time. **COMPANY:** Neon Software (510/283-977, *http://www.neon.com*). **LIST PRICE:** $139.

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# Viewpoint Model 100

MUCH LIGHT, SOME SOUND IN A SURPRISINGLY SMALL PROJECTOR

ONCE UPON A TIME, SHOWING A group of people what was on your Mac meant renting an LCD projection pad—an expensive, inch-thick plate-glass sandwich—and perching it atop an overhead projector. Never mind that such an overhead, a relic from the days of eighth-grade biology class, could overheat, wash out your images, or give you a hernia carrying it.

That's the beauty of a self-contained Mac projector, a single device that connects to your Mac. The Viewpoint Model 100 weighs 9.2 pounds, is the size of three stacked PowerBook 5300's, and throws a crisp, bright, extremely customizable image onto the boardroom wall from up to about 20 feet away.

What's more, the Viewpoint's phalanx of back-panel jacks stand ready to accommodate more than just your Mac: output cables from VCRs, camcorders, DOS-based computers, and even expensive S-Video gear can all find a home. If you feel you're not getting your $5795 worth showing slides during meetings, let this multitalented black plastic box double as a projection TV when you're at home.

Whatever you do, don't lose the remote control. It's the only means of controlling many of the Viewpoint's special features—and there are dozens. You can freeze the picture, enlarge the image, or both. You can summon a little pointing-finger cursor onto the screen and move it by pressing directional arrow buttons on the remote. You can adjust the color, tint, brightness, and so on. If you plan to mount the projector *behind* the screen or on the ceiling, the remote can flip the image horizontally or vertically. More practically, you can use the remote to switch between the Mac and your VCR.

On the projector itself, an effective keystone control compensates for a common problem: a projected image that's wider at the top than the bottom. On the other hand, the Viewpoint lacks adjustable legs; to adjust its angle, you'll have to stuff some magazines under it. So much for high tech.

The Viewpoint falls flat in the audio department. The unit's speakers are barely loud enough to fill a bathroom. And if you crank the volume, the speakers distort horribly. Given this nod in the general direction of the sound department, the included stereo pan, bass and treble, simulated stereo, and surround-sound stereo controls seem like fancy new deck chairs on the *Titanic*. Fortunately, the stereo-sound output jacks make it simple to connect external speakers.

Two other touch-ups are called for. First, the remote control offers no backlight (as some rivals do), so you'll be fumbling in the dark. Second, the manual, while clearly written, is a carnival of clashing fonts, sizes, styles, and misspellings of such challenging words as *handle*.

### The Last Word

Of course, you don't buy a projector for its manual or its remote—or, usually, even for its sound; size, weight, and picture quality are far more important. In that regard, the Viewpoint Model 100 has its heart in the right place. Its dozens of grace notes include a battery of useful visual effects; a clever, self-protective pop-up lens assembly; every conceivable cable and adapter (except the one to adapt a PowerBook's nonstandard monitor jack); three spare bulbs; and a well-designed carrying case. The Viewpoint is nearly everything you'd want in a projector—without the overhead.—DAVID POGUE

GIBSON

**RATING:** ★★★/6.9 **PROS:** Wonderfully small and lightweight; bright, crisp picture; remote control offers zoom, pan, and other special effects. **CONS:** Speakers too weak and distort easily. **COMPANY:** Lightware (503/641-7873, *http://www.lightware.com*). **LIST PRICE:** $5795.


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Circle 23 on reader service card

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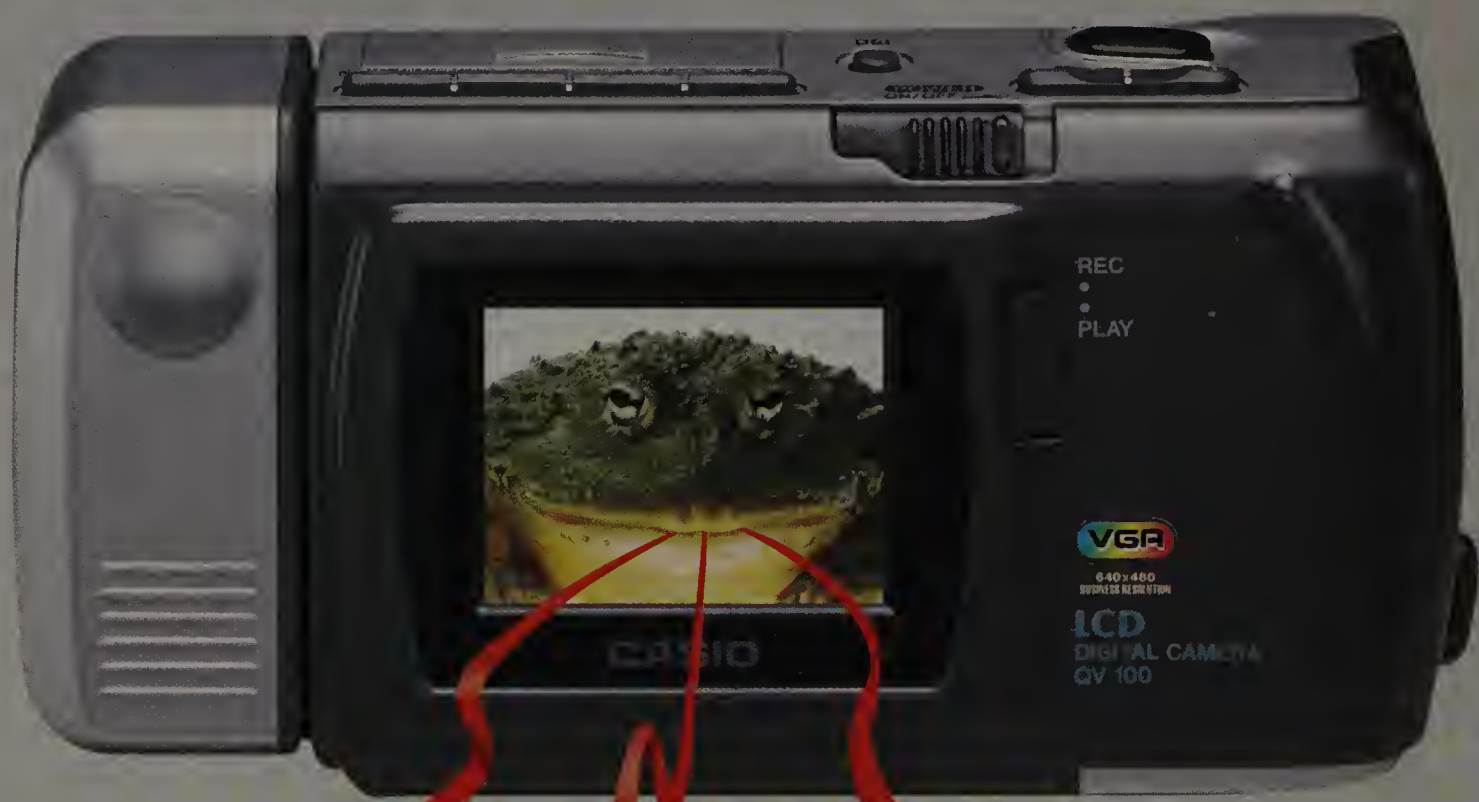


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# Amapi 2.1

MODELER FALLS SHORT OF BRILLIANCE

LAUNCHING AMAPI 2.11 IS A BIT LIKE waking up in a foreign country—it's an experience at once beautiful and alien. Developed in France, Amapi is built around an interface that's chic and conceptually innovative; unfortunately, Macintosh users may find it needlessly complex, often demanding, and occasionally awkward.

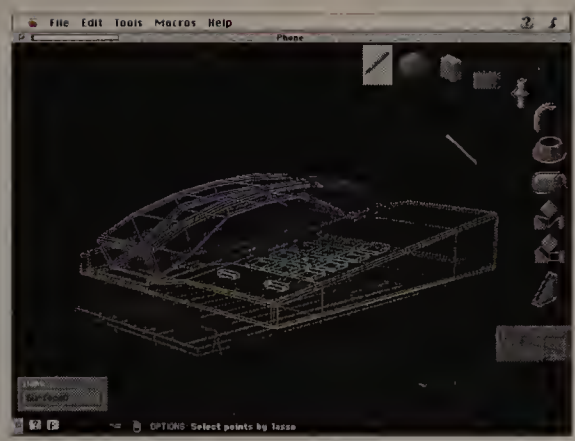
Less expensive than in its previous incarnation as Ashlar's Design Reality, Amapi offers a very competent, high-precision modeling environment suitable for applications ranging from industrial design to illustration. However, it lacks high-quality rendering and animation tools. If you need photo-realistic images or motion sequences, you have to export models elsewhere.

Amapi lets you build objects combining polyhedral and NURBS (nonuniform rational B-spline) surfaces. You can extrude, sweep, and loft 2-D elements into 3-D surfaces; build objects that are normally lathed, like goblets, by extruding the base-defining curve along a path describing the object's contours; and edit objects by manipulating vertices. Tools that build shapes from three or four defining lines and apply Boolean functions to objects make Amapi adept at producing compound-curved objects.

A virtual table supported by sawhorses sits in the center of Amapi's workspace, and you toggle among three tool palettes —Construction, Modeling, and Assembly—by sweeping the cursor off the side of the screen. Select a construction tool, and Amapi extends two hash-marked, color-coded axes from the cursor for easier 3-D alignment.

Sweeping the cursor downward displays a control panel that contains tools for grouping objects and producing quick-shade renderings. Amapi's Catalog palette lets you save documents simply by clicking on an empty thumbnail and naming the file. It's great for saving model iterations quickly or storing subassemblies for subsequent use in the workspace. Unfortunately, because cataloged objects retain their original location and orientation in space, you can't just drag them to new coordinates alongside other objects.

Amapi's interface is visually striking, but its operation isn't strikingly elegant.




**Lovely to Look At . . .** Amapi's interface looks good, but it's awkward to use.

For example, to relocate or duplicate newly created objects, you have to sweep the cursor twice to reach the palette containing the Move and Duplicate tool. You put some tools away with a cursor sweep, others need input validation with a carriage return, and still others require both. If you sweep too swiftly along the side of the screen, you risk inadvertently switching tool palettes or retiring the current tool. And Amapi's icons are confusing, featuring two hand icons, one for molding shapes and the other for moving objects, and a handlike mechanical pincer for stretching surface points.

Until you learn the program, you'll probably feel a little lost. Unfortunately, Amapi's documentation doesn't help much. The manual—really just a command reference—suffers from content errors, misidentifications, and translation problems. The online tutorial is almost incomprehensible. A new construction-exercise booklet is a step in the right direction, but it too is hampered by language difficulties and a poor layout.

### The Last Word

Amapi is a capable, if quirky, modeling program with a visually appealing but somewhat irritating interface. Amapi can produce excellent models, but its lack of rendering and animation tools limits its utility for many applications. In today's competitive 3-D market, there are better options.—CARLOS DOMINGO MARTINEZ

**RATING:** ★★★/5.7 **PROS:** Competent precision modeling tools. **CONS:** Quirky interface; poor documentation. **COMPANY:** Yonowat (415/788-1652, *http://www.yonowat.com*). **LIST PRICE:** $398.

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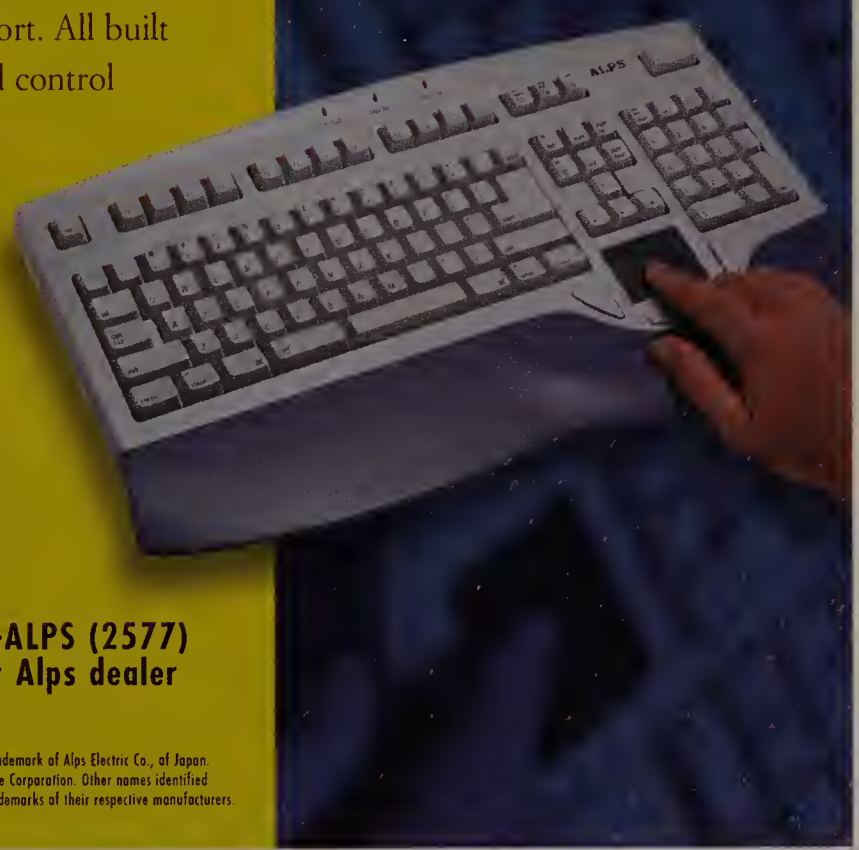

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Circle 43 on reader service card

# ElectricImage Broadcast

3-D ANIMATION TOOL GETS NEW FEATURES, NEW PRICE

FOR MOST MACINTOSH USERS, ELECTRICIMAGE Animation System is the holy grail of 3-D. The newest member of the EI family, ElectricImage Broadcast, offers all the features of the film version (see *Reviews*, December 1994), without the daunting price tag. Although it renders at lower resolution than its sibling, EI Broadcast is one of the most feature-laden animation tools available for the Mac.

Besides dropping the price, ElectricImage has added some features that make this version more robust: the Inverse Kinematics tools have been improved, the Camera Map Projection plug-in lets users create 3-D matte paintings from 2-D images, and the interface lets you drag multiple keyframes in the timeline. Along with the standard tool set of volumetric lights, motion blur, particle generators, and third-party plug-ins, these new features make EI one of the best 3-D applications in the business.

EI's biggest strength is the animation interface. The new version lets you look at a scene from the point of view of a light source; move the camera and its reference point independently; pan, tilt, zoom, and dolly by dragging within the camera window; and scrub or preview an animation from any window.

Because you can edit an animation as you would a spreadsheet, you can import data from and export to applications such as Microsoft Excel. Once you've completed the animation, you launch the Camera application to render the files using Phong shading, the Projector to convert animations into different formats for playback, and the StillCamera application to render high-resolution images.

EI may be the fastest-rendering 3-D application on any platform; in just minutes it renders complex, million-polygon scenes that would choke the average program. Notably absent are multiple cameras, QuickDraw 3D rendering support, adequate documentation, and a robust texture-mapping interface. Another disappointment is that the distributed- and batch-rendering component is unreliable in multimachine environments, with one or all of the computers often dropping out of the rendering queue. Electric Image says version 2.7.5 (Broadcast is essentially version 2.7) will fix the rendering problems and add multiple cameras; the next major release, expected early next year, will add a modeler.

**3-D Powerhouse** Not only does ElectricImage deliver excellent image quality, but it rendered this scene in less than three minutes on an 8500/120.

**The Last Word** For professional 3-D designers, ElectricImage is the industry workhorse. It's easy to use, the rendering quality is superb, and it's *fast*.—CRAIG LYN

**RATING:** ★★★★/7.8 **PROS:** Fast, high-quality rendering; excellent control over animation variables. **CONS:** Marginal documentation; unreliable distributed rendering. **COMPANY:** ElectricImage (818/577-1627, *http://www.electricimg.com*). **LIST PRICE:** $2495.

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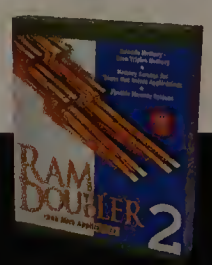


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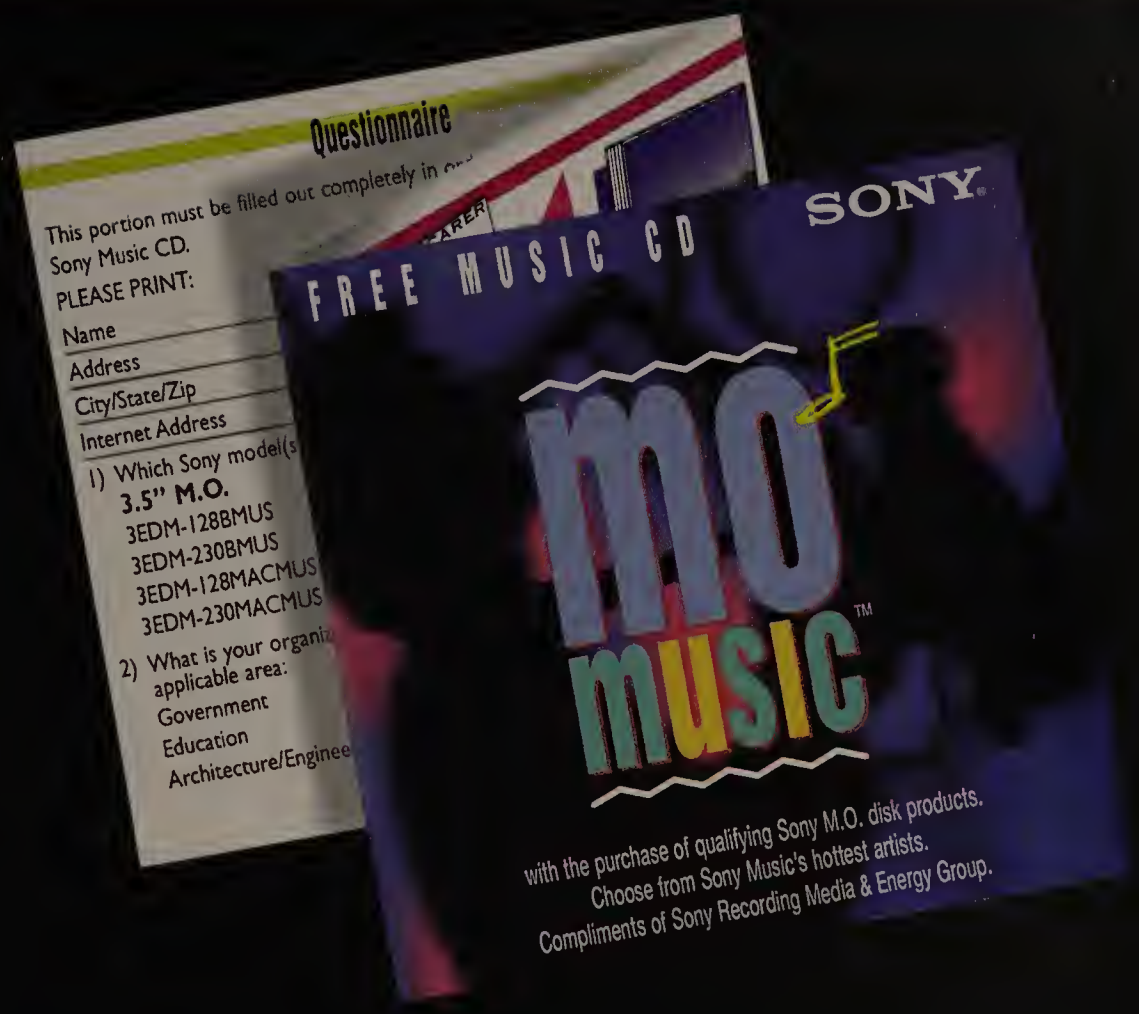


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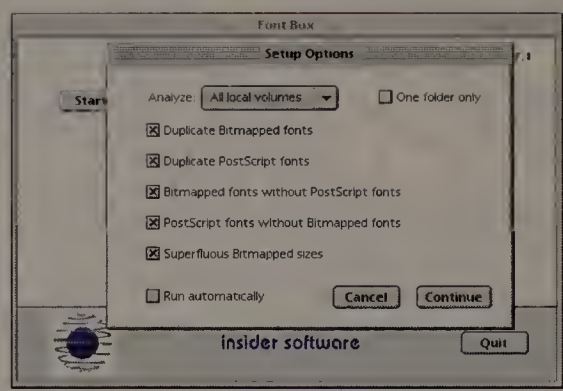
# Font Box 1.8

FONT FIXER COULD USE SOME REPAIRS

HAVING TROUBLE FINDING RARELY used fonts? Constantly rounding up fonts installed willy-nilly? Suspect that corrupted screen fonts are causing problems? These and other frustrations are addressed by a new breed of font-maintenance utilities—first Rascal Software's theFONDler (see *Reviews*, April 1996) and now Insider Software's Font Box 1.8.3. Unlike Symantec's Suitcase and Alsoft's MasterJuggler, these utilities help consolidate, repair, and organize large font collections. Font Box is easy to use, but it begs for some serious repair work itself.

Font Box has a one-track mind, essentially approaching each task by finding, repairing, and reorganizing all your fonts. You tell Font Box where to search for fonts and the things you want corrected (see "Having Problems?"), then tell it where to store your newly defect-free fonts, how to organize them (in their current location, in one new folder, or divided into subfolders), and whether to save or delete the originals. Font Box looks for the fonts in the specified locations and asks what you want to do with corrupted or otherwise problematic fonts, rebuilds your entire font collection, fixes font ID conflicts, reunites font family members, and resolves the issues you specified. Depending on the size of your font collection, the extent of the problems, and the speed of your Mac, the entire process can take anywhere from a few minutes to half an hour.




**Having Problems?** You can direct Font Box to delete duplicate fonts, reunite orphaned font parts, and discard screen fonts in unneeded point sizes.

While Font Box may claim to take you to font utopia, the program isn't without flaws. Options and buttons are labeled confusingly, and the program doesn't prevent you from enabling incompatible options. On my PowerBook, the problems listed in the dialog boxes are practically unreadable. If Font Box runs out of RAM or disk space, it quits. If you want Font Box to analyze and organize a set of specific folders or drives, you have to quit and relaunch after each has been processed (that's also how you cancel an in-progress analysis). Font Box's optional written reports sometimes go haywire; one, at 21.5MB, was far larger than my font folder. The program doesn't save your previous settings, it often won't clean up a disorganized font collection, and it doesn't delete AFM files.

**The Last Word** I recently spent many tedious hours reorganizing hundreds of fonts. Not long after, Font Box did the same thing much better and in a matter of minutes. In contrast, theFONDler practically requires a Ph.D. in fontology. And while MasterJuggler 2.0 and Adobe's ATM Deluxe 4.0 (now in beta) both scan for corrupted fonts, neither can help you make order out of chaos. Flaws and all, at the moment Font Box is the best font-organization and -maintenance utility available.—ROBERT C. ECKHARDT

**RATING:** ★★★/6.6 **PROS:** Quick, virtually automatic font reorganization and repair. **CONS:** Nearly endless design flaws; expensive. **COMPANY:** Insider Software (619/622-9900, *http://www.theinside.com*). **LIST PRICE:** $169.95 Professional (network edition), $79.95 Preferred (stand-alone edition).

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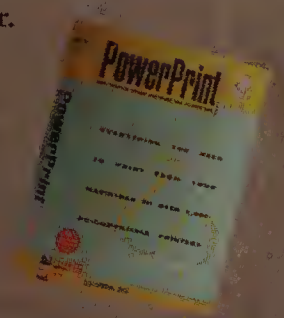


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**Circle 32 on reader service card**

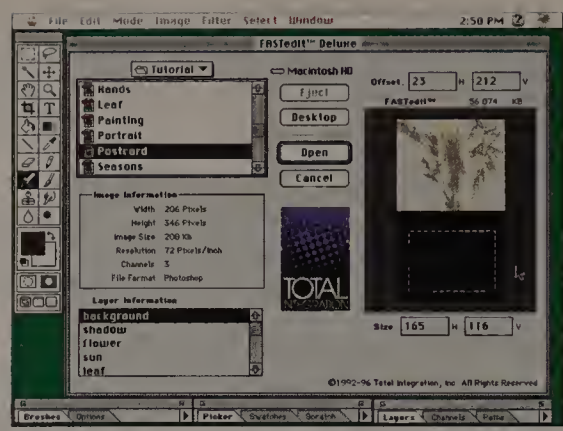
# Fastedit/Deluxe

PHOTOSHOP PLUG-INS HAVE A TROUBLING DRAWBACK

LARGE AND COMPLEX IMAGES CAN be ponderously slow to open and manipulate in Adobe Photoshop. If you find yourself waiting whenever you need to do a minor touch-up, Fastedit/Deluxe, a pair of Photoshop plug-ins, might be the answer.

Fastedit's Acquire plug-in lets you open a portion or single layer of a Photoshop image. You define image sections by dragging across a preview, and you can select individual layers via a scrolling list. When you're done with your edits, the Export plug-in updates the original file, incorporating your changes. If necessary, you can save the image segment and return to it later for further editing.

Isolating image sections means you spend less time opening files before you start working. And because Photoshop doesn't have to juggle the entire image, computationally intensive tasks, such as applying filters and transformations, are faster as well. However, one disadvantage of working with an individually acquired image layer is that you don't see how the changes will look in relation to elements in other layers. In many cases, you'll want to open the entire image anyway.




**Just a Small Portion, Please** Dragging across the preview in Fastedit/Deluxe's dialog box lets you define image sections for editing in Photoshop.

Fastedit/Deluxe does reduce the RAM and disk space required to edit an image. If this is a pressing concern, it may be worthwhile, but many Photoshop pros already have the hardware resources to deal with their normal work. As well as handling Photoshop files, Fastedit/Deluxe can access images in TIFF, Scitex CT, DCS, and EPS file formats. Unfortunately, it doesn't support many formats, including such common ones as JPEG, GIF, Illustrator, and PICT. Total Integration promises more formats.

Despite its basic utility, Fastedit/Deluxe's copy protection will be reason enough for many pros to banish it from their studios. You can't simply drag these plug-ins to the Photoshop folder. You must use an installer that permits only one installation. You can uninstall the plug-ins and move them to another machine, but if you need to reinstall the software, you're out of luck. Worse, after moving Fastedit/Deluxe I had to spend a day troubleshooting, and in the end resorted to a clean reinstallation of the Mac System to get Photoshop running again. Unorthodox circumstances? Yes, but caveat emptor just the same.

**The Last Word** Fastedit/Deluxe can be a helpful utility for editing image sections in Photoshop. However, inconvenient and potentially dangerous copy protection, limited image-format support, and a relatively high price (almost a quarter of the list price of Photoshop itself) lessen its usefulness.—CARLOS DOMINGO MARTINEZ

**RATING:** ★★/4.7 **PROS:** Lets you open user-defined sections and individual layers of Photoshop images. **CONS:** Copy protection can cause problems; limited image-format support; relatively expensive. **COMPANY:** Total Integration (847/776-2377, *http://www.totalint.com*). **LIST PRICE:** $249.

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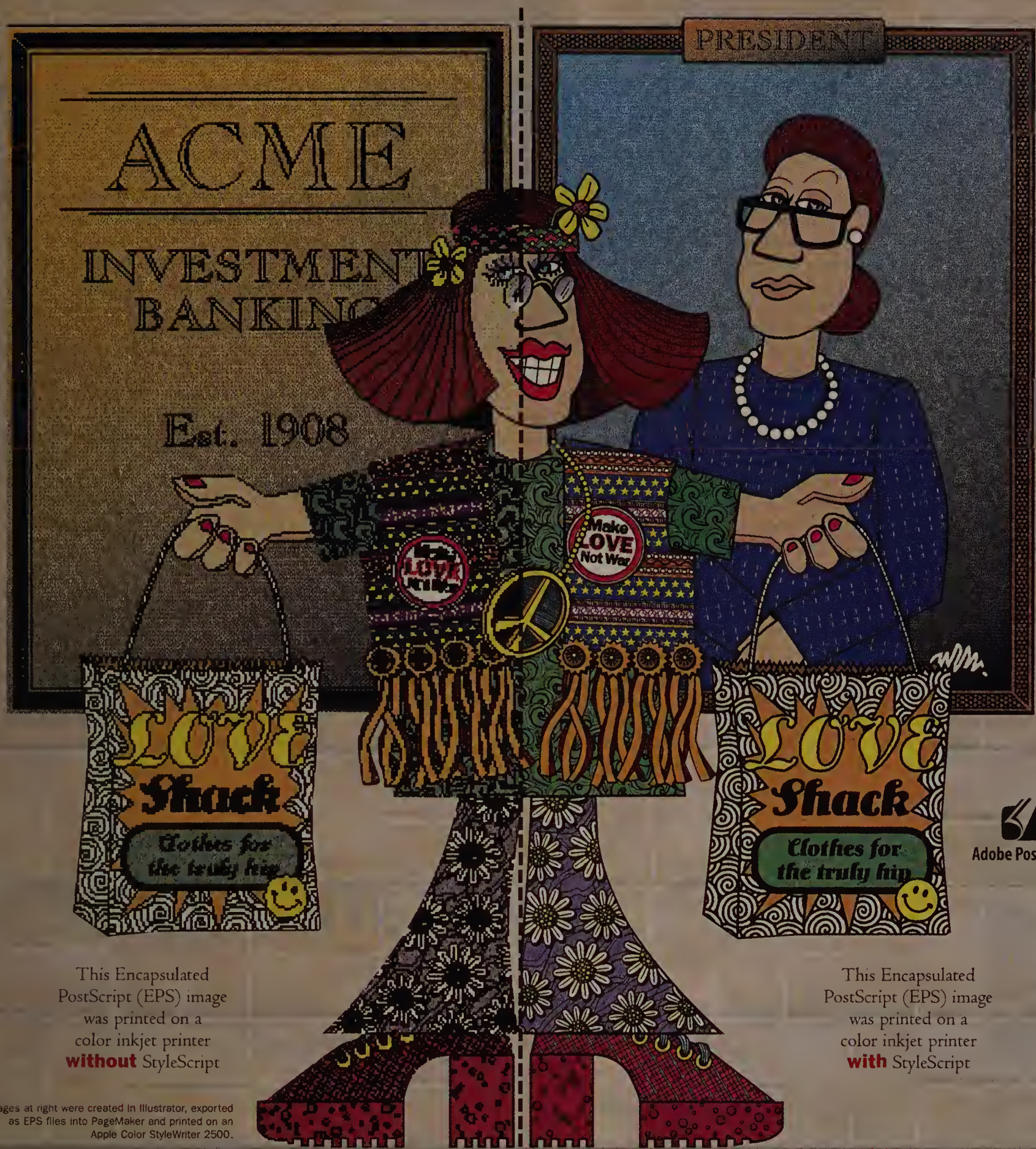


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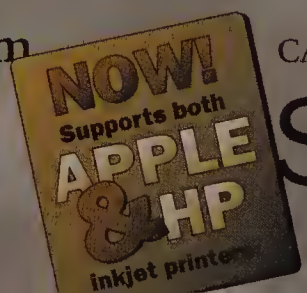


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# NovaModem 288

DECENT PERFORMANCE
FROM POWERBOOK PC CARD MODEM

ROBERT PERRY

THE INEXPENSIVE NOVAMODEM 288 for Macintosh offers several features—including voice messaging and direct cellular capability—that you won't find in some competing PC Card modems. Alas, this is clearly a Windows-based product that was pressed into Mac service as an afterthought.

Installing the NovaModem 288 on my PowerBook 5300ce was a snap—I tried plugging it into both of the PC Card slots, and the laptop recognized it within seconds. The bundled software, Smith Micro's MacComCenter, has convenient one-click installation that checks the modem and installs the proper drivers. Unfortunately, no connection scripts for Apple Modem Tool are included; I had to call technical support to get the modem up and running. And while the manual is serviceable, it was obviously written with the Windows user in mind.

Although I got consistently solid connections to America Online, CompuServe, and various Internet providers, true 28.8-Kbps speeds weren't as frequent as with other PC Card modems I've used—I usually connected at 26.4 Kbps or less. (A 33.6-Kbps version of the Nova Modem is scheduled for release sometime this year. I couldn't test the beta's speed claims, however, since the major online services don't yet support speeds that high. NovaLink won't be offering a trade-in upgrade to users of the 28.8-Kbps version or a FlashROM upgrade for the new modem code.) The only real connection problem I encountered was with Claris Emailer: when the modem was installed in my PowerBook's lower PC Card slot, I couldn't dial out. NovaLink and Claris are looking into the problem.

MacComCenter includes fax and telecommunications capability, plus a component that lets you set up your PowerBook as an answering machine. As fax software, the program does the job; it lacks gray-scale support, however—something you'd find in competing products. The software's voice module is relatively easy to configure, and you can record your own greetings or use the included canned messages. The program also supports additional users by letting you create multiple mailboxes.

Unfortunately, retrieving messages from another location is limited to an auto-forward feature; you can't call in or page the program from another location to get your messages. Worse, one feature offered in the Windows version—paging—isn't supported at all in the Mac version.

**The Last Word** It's a tribute to Apple's PC Card support that a modem designed for the Wintel world can be used easily on PowerBooks. With better fax and voice-messaging software, the inexpensive NovaModem 288 could lead the pack of PC Card modems.—GENE STEINBERG

**RATING:** ★★★/6.0 **PROS:** Easy setup; fast, fairly reliable connections; good tech support. **CONS:** Mediocre fax and telecom software; voice software lacks remote dialing feature; instructions are for Windows users. **COMPANY:** NovaLink Technologies (510/249-9777, *http://www.novatech.com*). **LIST PRICE:** $229.


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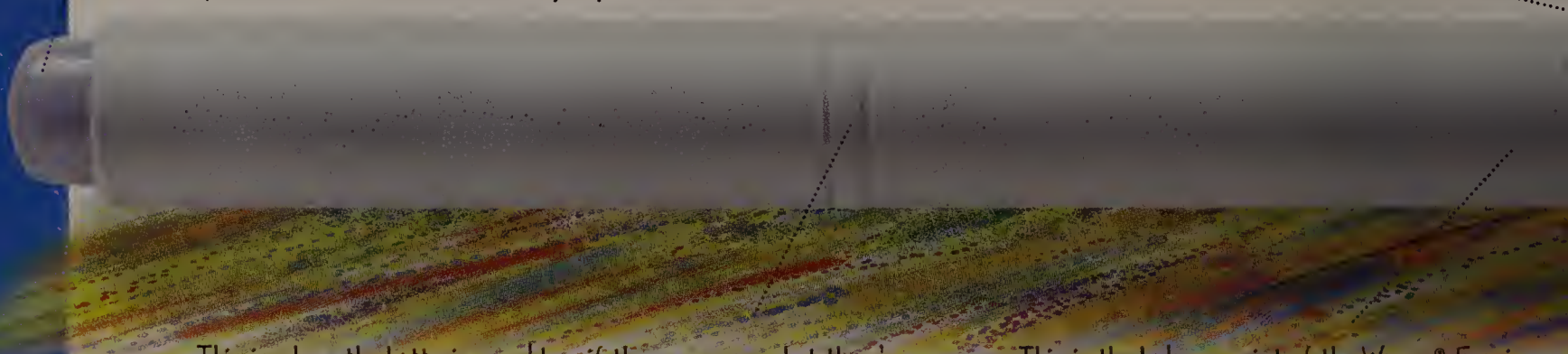

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# Pro View 1.3

A BACK-TO-BASICS PRESENTATION TOOL

PRO VIEW 1.3 IS AN INEXPENSIVE, unpretentious authoring tool that makes creating multimedia presentations a snap. The program allows you to blend text, graphics, sounds, and QuickTime movies into interactive presentations or self-running slide shows—without touching the manual.

In its first release, Pro View lacked stability and had such limited features that it was hard to produce really professional results with it. With version 1.3, E-magine has improved the program's performance with features that allow you to create more-sophisticated presentations, while the interface remains uncluttered and intuitive.

The program offers superb drag-and-drop support. You can add pictures (PICT or JPEG), text, and movies to your presentation by dragging them from the Finder. You can also drag elements from one Pro View page to another. If you option-drag a set of images onto a new Pro View presentation window, the program automatically imports all the pictures, neatly placing each image on its own separate page.

Once you've imported elements into Pro View, you make your presentation interactive by adding hot spots, allowing viewers to navigate through presentations, trigger sounds, or print pages. You can also turn imported graphics into buttons.

**Plain-Vanilla Authoring** Pro View's simple ten-button palette lets you import movies, pictures, and text to presentation pages, then add interactivity by placing buttonlike hot spots on the pages.

Several new tools make it easier to format and position elements. You can now drag-select multiple items and align them with an Align Objects command. A new cropping tool allows you to crop imported pictures. Other new tools let you create a tiled background from an imported PICT or JPEG image, and add a smooth fade-to-black transition between screens in your presentation for a sleek, polished look.

You can save your presentations as Pro Viewers, with the option of compressing all the imported graphics, sounds, and movies into the Viewer. Your presentation then becomes a self-contained Viewer document that you can distribute freely.

Admittedly, Pro View can't compare to full-blown authoring programs or even slide presentation programs; it takes a bare-bones approach. But it costs less than $100—and it has enough of the right tools to yield genuinely impressive results with a minimal learning curve.

**The Last Word** Pro View doesn't let you create path animations or apply fancy transitions between slides—but frankly, many people don't require such features. If you need to create professional-looking multimedia presentations under a tight deadline, Pro View is a perfect choice.—JOSEPH SCHORR

**RATING:** ★★★★/7.8 **PROS:** Simple, uncluttered interface; excellent drag-and-drop support; creates stand-alone documents with run-time engine; inexpensive. **CONS:** Limited file-format support; no path animation; limited transitions. **COMPANY:** E-magine (800/603-1474, *http://www.e-magine.com*). **LIST PRICE:** $99.95.


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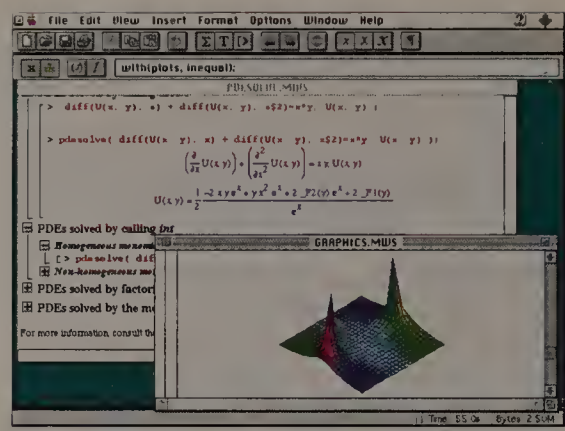
# Maple V Release 4

MATH SOFTWARE PICKS UP SPEED AND INTERFACE REFINEMENTS

AS A SERIOUS CHALLENGER TO Wolfram Research's Mathematica, Maple V had three deficiencies: it wasn't Power Mac native, its graphics lacked many 3-D display features, and it offered no simple way to get textbook-format equations on screen. The latest release of Waterloo Maple's mathematics software not only corrects those shortcomings, it makes Maple the best choice for users with hardware limitations or demanding speed requirements.

The program is almost twice as big as it was a year ago, but it actually runs faster. Waterloo Maple has added a plot-tools package that brings Maple close to Mathematica's graphics capabilities; enhanced differential and partial differential equation-solving; enlarged the special-functions libraries to handle most physics and engineering cases; and added tensor analysis. And not only do Maple V documents look like math rather than programming-language text, but they also contain hyperlinks—even the online help is now hyperlinked.

Mathematica 3.0, still in beta at review time, remains the leader in certain areas. Its signal-processing facilities are excellent; its implementation of a palette-based math-notation entry system for rich document formatting is brilliant; and its collection of user-contributed notebooks is much larger than Maple's analogous Share Library. Outside these areas, however, Maple's speed and relative simplicity—you can learn enough to do something useful in an hour—are key advantages.




**Symbols and Pictures** Maple V now displays typeset-quality equations on screen, and graphics are significantly improved over earlier releases.

Recognizing that 150MHz Power Macs with 64MB of RAM are still a rarity in classrooms, Waterloo Maple designed the full implementation of Maple to run on an 8MB Mac; a separate command-line version is included that can run with room to spare in 4MB. That version has essentially no interface or graphics overhead, so it's great for high-speed computation on problems coded in the full-blown Maple interface. And it's *really* fast—the math tests that Macworld Lab used in a recent roundup of science software run so quickly on a Power Mac 7100/80 they can't even be timed in command-line mode. The command-line program's speed at diagonalizing a 20-by-20 matrix on a PowerBook 145B is an amazing spectacle; it's unlikely that Mathematica will ever run on such a humble box again.

**The Last Word** Maple has an edge over Mathematica in both large-scale, hours-long computations and the small-scale computations typical of education. Release 4 is the fastest, most complete version yet, and its modest hardware requirements will appeal to budget-minded math sites.—CHARLES SEITER

**RATING:** ★★★★/7.8 **PROS:** Fast; easy to learn; runs well on modest systems. **CONS:** Fewer user-contributed packages and more-basic document-formatting options than in Mathematica. **COMPANY:** Waterloo Maple (519/747-2373, *http://www.maplesoft.com*). **LIST PRICE:** $995; academic version $695.

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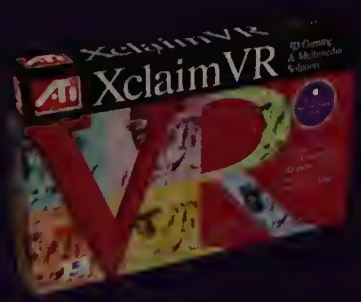


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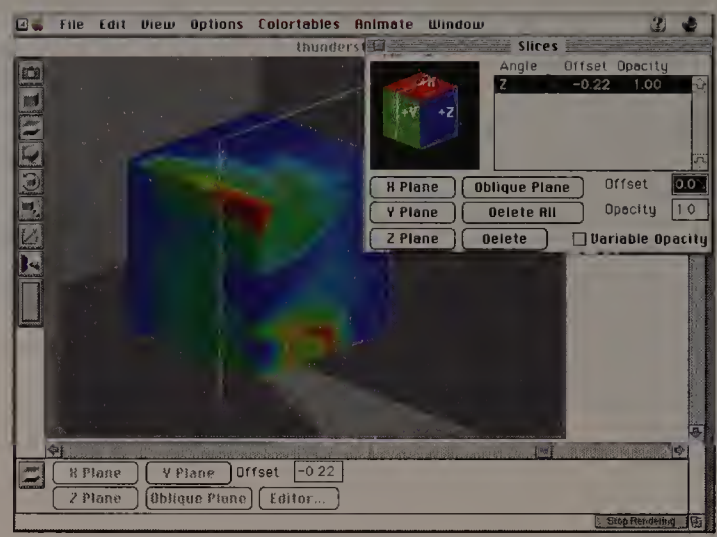
# Slicer

VIEW 2-D SLICES OF 3-D IMAGES

ANY TIME YOU SEE A COLOR PICture on your Mac, behind the scenes the computer is reading numbers from a table and converting them to their corresponding color values. That's a good thing, the human brain being better equipped to process color pictures than tables of numbers. Even scientists can extract more information from a picture than from raw data in a table; for example, an MRI scan is actually a 3-D table of numbers, but doctors look at 2-D "slices" of the data to make a diagnosis.

Even better than the visualization software shipped with MRI systems is Fortner Research's Slicer. Not only does it use a sophisticated ray-tracing system to present 2-D images using a huge range of color tables, but it lets you create animations from a series of slices and make rectangular cutouts in 3-D mode. You access the viewing, slicing, and rotating tools, all of which are workstation-fast, through palettes in the notably straightforward interface (see "Cut to the Heart").

Although Slicer 1.0 is officially (if not technically) a brand-new Mac product, it's amazingly bug-free. And it's particularly adept at importing and exporting—not just HDF and other standard science data-set formats, but data in the whole range of FORTRAN and C variable types (the actual images, rather than data, are exported as PICT and TIFF files). The advantage of such a wide scope is that Slicer can easily display almost any data.




**Cut to the Heart** Almost every 3-D data set has a particular 2-D Slicer view that points out key data features. Slicer lets you find and display this key slice in record time.

Slicer does lack a few minor conveniences; for example, it would be nice to have a simple, usable tool for specifying a straight line through a 3-D image and viewing an *x-y* plot of values along that line. (The company's Web press release claims this as a feature, but I couldn't find it in the slender documentation or tool palettes.) It would also help if the isosurface simulation had more scope: you can pick a number value and render the pixels with other values transparent, but there's no reason this trick couldn't be extended to allow visualization of two, three, even four 3-D isosurfaces in a single image. (It probably will be soon—Fortner Research has the staff for doing just that.)

**The Last Word** Considering that Slicer 1.0 has no real competition, it's impressive that Fortner Research has done such a great job. For fast visualization of 3-D volumetric data, Slicer and the Macintosh are an unbeatable combination.—CHARLES SEITER

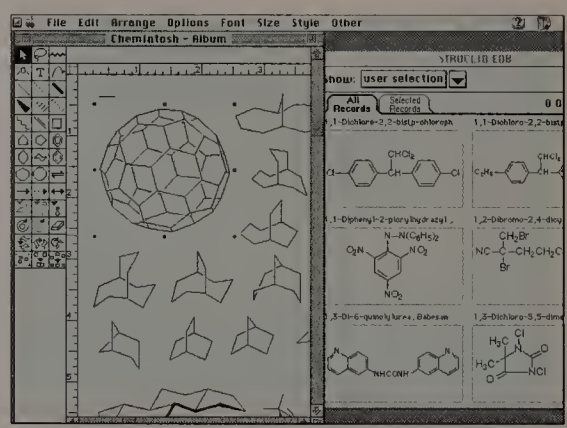
**RATING:** ★★★★/8.1 **PROS:** Fast; bug-free; easy importing of data in nearly any format. **CONS:** Lacks a few useful options. **COMPANY:** Fortner Research (703/478-0181, *http://www.fortner.com*). **LIST PRICE:** $695.

# ChemIntosh 3.4

DRAWING TOOLS FOR CHEMISTS

BACK IN THE MID-1980S, WHEN INtel-based computers were timidly learning to format text, the Mac's graphics superiority made it a natural choice for chemists. SoftShell got into the market early with its ChemIntosh structure-drawing software and has managed to maintain its loyal following.

One big reason for this loyalty is that, although the program has evolved considerably, it still has the shortest training time in the business. If you can draw structures with a pencil, you can use ChemIntosh's drawing tools immediately—every element you need to build a structure is available on an exceptionally simple palette (see "Picture This"). The intuitive interface is now supplemented with a much larger directory of predrawn compounds, a drawing utility (MS Palette Tool), an oddly named but relatively structured database (Entropy Lite 1.1), and an assortment of tools for diagramming processes (Chemical Engineering Collection) and depicting lab setups (Laboratory Glassware Collection). A new addition called ChemWeb, which translates ChemIntosh structures into GIFs for posting on the Web, is available free from SoftShell's Web site. There's even a spelling checker for chemical documents, a useful feature given that standard word-processor dictionaries have only a few dozen chemical terms. The output is excellent, and the documentation, while brief, is sufficient for a program as self-explanatory as this.




**Picture This** From buckyballs to benzene, ChemIntosh makes it easy to draw molecular structures.

ChemIntosh isn't without rough edges, however. SoftShell used to be a Mac-only, then a Mac-first operation. Now ChemIntosh is a nonoptimized port of its Windows counterpart, ChemWindow, and an early version of ChemIntosh on a Mac SE is actually faster at menu response and most drawing functions than the current version (3.4.4) on a Power Mac 7100. Another problem is a somewhat lazy export: you can export to CambridgeSoft's ChemDraw format or to Molecular Design's popular MDL molefile format, but you'll have to resign yourself to lots of editing and tinkering to get the exported file exactly right. That might be simply a consequence of ChemIntosh's current second-class citizenship in SoftShell's world, but it's a nuisance if you're using the program for anything fancier than preparing documents. This shortcoming also points up a strength of its main competitor, CambridgeSoft's ChemOffice; ChemIntosh is a bit easier to learn for basic tasks, but ChemOffice is better linked to the larger world of computer-based chemical information on legacy systems.

**The Last Word** If all you're looking for is help producing chemical documents, ChemIntosh is your guaranteed least-effort choice. For serious chemical database work or molecular modeling, though, you'll probably want ChemOffice.—CHARLES SEITER

**RATING:** ★★★/6.8 **PROS:** Easy drawing of chemical structures; useful database and accessories. **CONS:** Some export and performance problems. **COMPANY:** SoftShell (970/242-7502, *http://www.softshell.com*). **LIST PRICE:** $799 ($199 academic, $99 student).

# 3 OUT OF 4 GAME CHARACTERS SURVEYED

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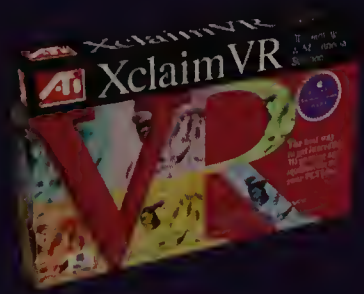


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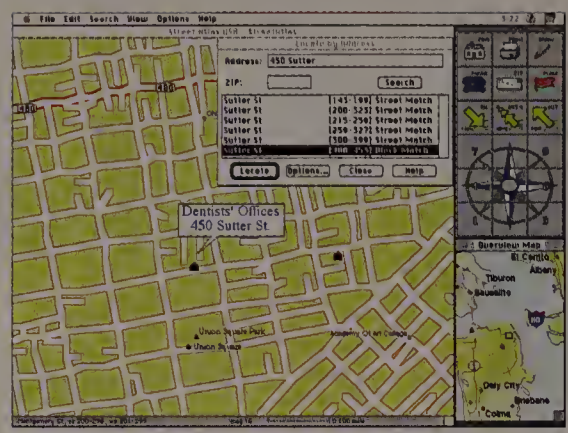
# Street Atlas USA 3.0

MAP PROGRAM BETTER AND CHEAPER, BUT STILL FLAWED

WHEN I REVIEWED VERSION 2.0 of Street Atlas USA, DeLorme Mapping's CD-ROM containing colorful, detailed maps of the entire United States, I liked it enough to overlook such problems as questionable data integrity and annoying interface quirks (see *Reviews*, October 1994). Version 3.0 is considerably less expensive and contains some useful new features, but it suffers from many of the same flaws.

Upon launching, Street Atlas USA fills the screen with a detailed map, a floating toolbox, and a new overview map. The tools are pretty much self-explanatory and there is online help, which is good since the 24-page user's manual is weak.

As with version 2.0, you can search by area code and exchange, zip code, or city name. The most significant new feature is the ability to locate a specific building—enter a street address and zip code, and its approximate location on the block is shown on the map. Thanks to efficient indexing, searching takes only a few seconds, but drawing a map can take up to 20 seconds, even on newer Macintoshes.




**Street-Level Mapping** You can search for specific addresses, as well as phone numbers, zip codes, cities, and streets. Also new are the overview map and user-definable notes.

Street Atlas USA 3.0 links to DeLorme's Phone Search USA (also reviewed in this issue). After searching this directory, you can press the Map button to see the location of the selected entry in Street Atlas USA. Unfortunately, disc-swapping is needlessly complicated.

A slew of new land-use tints for woodlands, parks, wetlands, and other land types can be turned on or off—like other map features such as roads, bodies of water, and place names—to display only the level of detail you want. Also new are user-definable text, symbol, and note objects for annotating maps. Finally, you can now change the location and size of the title and legend, and display zip codes, latitude, and longitude.

**The Last Word** I uncovered a number of inaccuracies, such as through roads not connecting, railroads appearing where none exist, and towns missing or misplaced, in Street Atlas USA 2.0. Unfortunately, such errors persist in the new version, despite DeLorme's claim to have doubled the number of street segments to 25 million. Furthermore, Street Atlas USA still suffers from user-interface problems. For example, ⌘-W doesn't close windows, you can't pan around the map with a hand cursor, and editing draw objects is completely unintuitive.

Its flaws notwithstanding, there's nothing that compares to Street Atlas USA 3.0, and I recommend it to anyone with even a passing interest in cartography. Be warned, however, that the license allows making maps for personal and in-house business purposes only.—OWEN W. LINZMAYER

**RATING:** ★★/4.5 **PROS:** Inexpensive; fast, detailed searches; tremendous amount of data; fun. **CONS:** License limits practical applications; questionable accuracy; some interface foibles. **COMPANY:** DeLorme Mapping (207/865-1234, *http://www.delorme.com*). **LIST PRICE:** $79.

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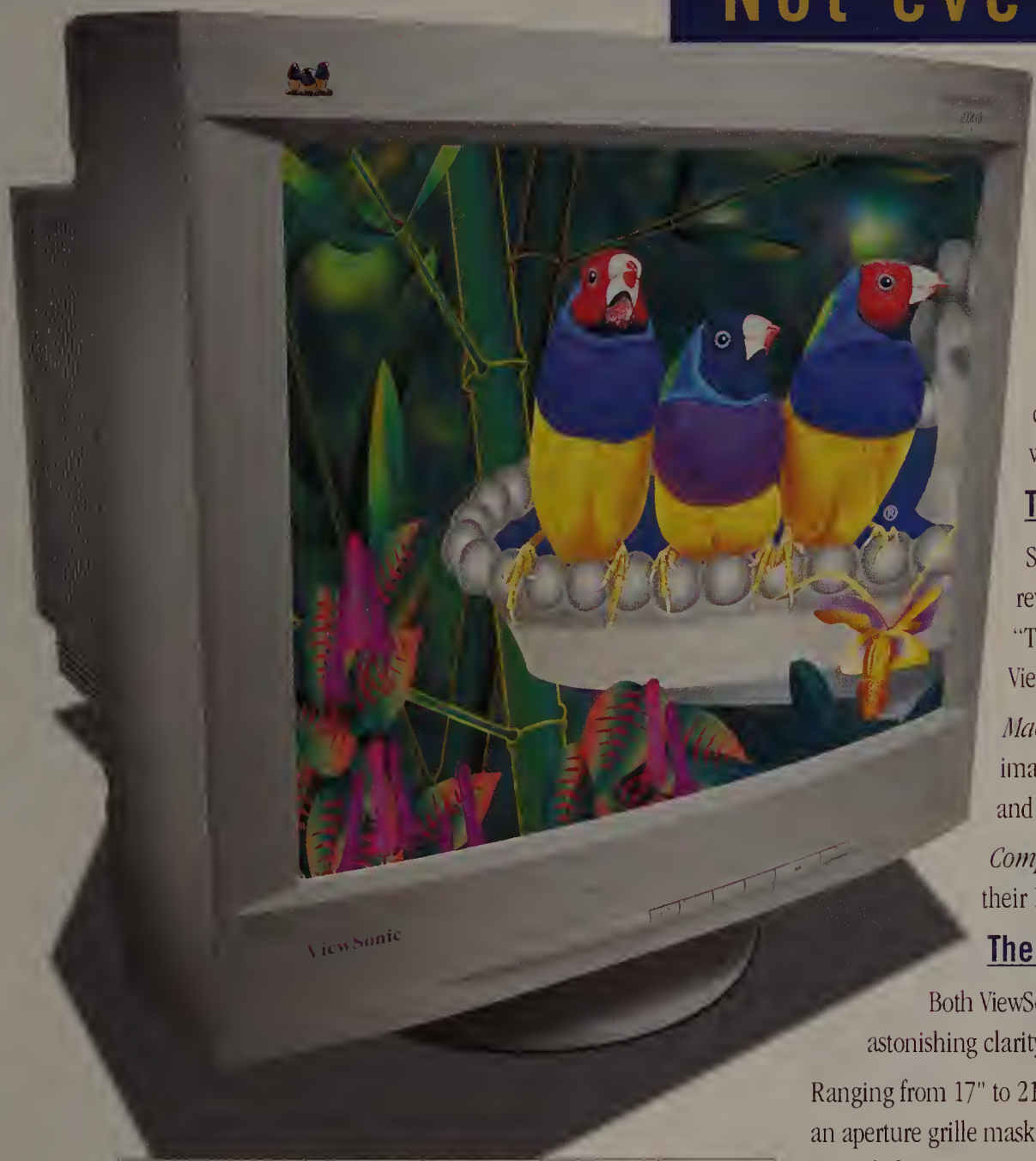


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# Hexen

THE HERETIC FANTASY CONTINUES

OK, I ADMIT IT: I LOVE TO KILL things—that's why I like Hexen. Not only do I get to kill things, I get to kill lots of them, and I get to do it in new and interesting ways. Not only can I turn my enemies to ice, I can also fry 'em, tear 'em apart with spirits, chop 'em up, and even transform them into little piggies. Oh, the fun of it all!

Distributed by GT Interactive, Hexen is the latest production from Raven Software using an engine licensed from id Software (creator of Doom), and it lives up to Raven's previous standards of gore. The designers have taken game play a step further by allowing players to choose from one of three classes of characters: warrior, cleric, or mage. Each class has its own strengths, weaknesses, and—above all—weapons. Depending on which class you pick, your strategy must adjust for speed, range of weapons, and armor. Clerics have access to Wraithverge, a must-see weapon that summons spirits to rend your foes limb from flying limb.

Breaking away from the linear progression of levels, you proceed from hubs, each broken down into a series of levels that must be cleared. Within levels, the play environment runs the gamut from lava pits to fog-filled swamps to icy caves. The environments keep the game interesting. Even if you're not actively killing things, you can marvel at the landscape.

**Freeze!** If you tire of tearing opponents limb from limb, you can give them the cold shoulder.

Each level is filled with plenty of levers to pull, items to find, and hidden chambers to discover, all of which eventually help to unlock the secret of the hub itself, allowing further travel. Unfortunately, these puzzles aren't terribly challenging and tend to require a lot of repetitious wandering from level to level. But since your foes regenerate when you least expect it, you won't be bored for long.

Hexen's game engine is essentially identical to that of its predecessor, Heretic, with a few innovations. You can look up and down, strafe, jump, and even fly, but Hexen lacks features that other engines now allow, such as ducking and peeking around corners.

Should you feel the urge to blast the daylights out of your coworkers, Hexen offers modem and network play for as many as four Macs using TCP, AppleTalk, and MacIPX protocols. You can even take out your aggressions on your Windows-equipped colleagues: Hexen's multiplayer mode is cross-platform capable.

**The Last Word** Hexen is another strong showing from Raven. Its action-packed game play allows you a number of possible ways to kick butt, despite the limitations of its engine and the simplistic nature of its puzzles.—DANIEL MADAR

**RATING:** ★★★/6.9 **PROS:** Realistic violence; interesting new levels and choice of character types. **CONS:** Static puzzles; linear and simplistic story line; engine doesn't offer as much flexibility as competitors'. **COMPANY:** GT Interactive (212/726-6500, *http://www.gtinteractive.com*). **COMPANY'S ESTIMATED PRICE:** $54.95.

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Reviews, July 1995

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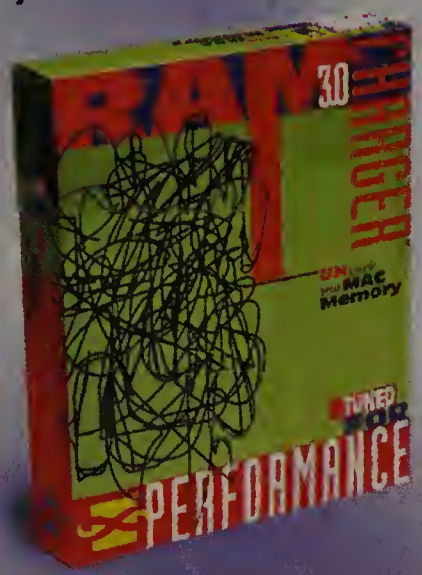


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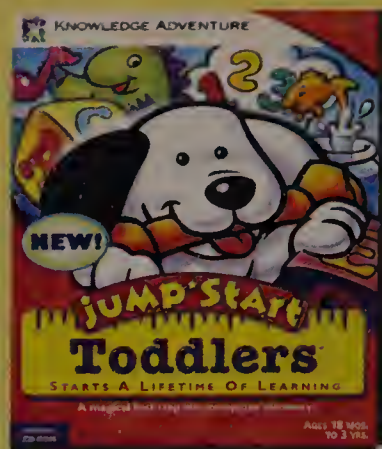
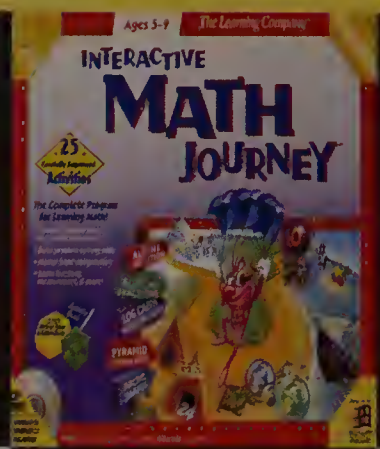



*JumpStart Toddlers features musical animals, bouncing shapes and an enchanted chalkboard to present the alphabet, numbers and over 200 vocabulary words in this magical first step in computer discovery for children 18 months to 3 years. From Knowledge Adventure.*




*What's the best tool for kids to learn about basic fractions? A pizza, of course. That's just one of the 25 fun activities found in Interactive Math Journey. With it, kids build skills, problem-solving abilities and most important, confidence in math. From The Learning Company.*

*Freddi Fish and his sidekick Luther are on the case of the haunted schoolhouse and its missing toys. This undersea mystery has everything to keep the kids entertained for hours as they help the finned dynamic duo solve the crime. From Humongous Entertainment.*

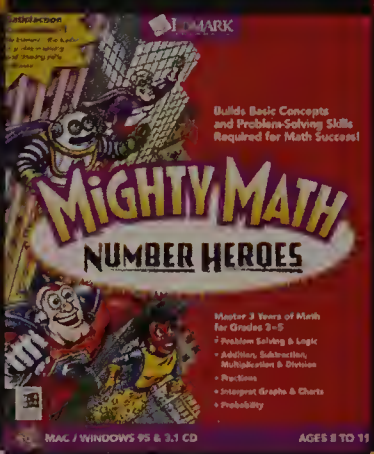
*The Canine Revitalizer's been stolen and it's Elroy and Syd's science project. What happens if they can't solve the riddles, unravel the codes and crack basic science puzzles to solve this terrible crime? A fate too scary for any kid—summer school. From Headbone Interactive.*

**Your kids ca**

*Now there are ten widely acclaimed Macintosh games in their original format, all in one package. You'll find great entertainment titles like Wing Commander III, PGA Tour Golf III and System Shock, plus three hot edutainment titles for the kids. From Electronic Arts.*

*Join Kermit and the Muppet crew in their very own version of the Robert Louis Stevenson classic, "Treasure Island." Outsmart the scurvy pirates as you discover puzzles, activities and fun learning games in this exciting interactive hunt for buried treasure. From Activision.*

*Deep within the heart of the Math Metropolis lies the secret to math success. Whether kids are having a tough time with math or are certified math superstars, Mighty Math Number Heroes will put them on the road to math greatness. From Edmark.*




*This new edition of Carmen helps kids with world geography and cultures as they explore 50 countries, getting fun clues from animated characters along the way. A rich database is included, with video clips from the National Geographic Society. From Broderbund.*

*A collection of third-party software from Apple Computer handpicked with you and the Internet in mind. You're on the web in minutes with the help of the easy-to-use Internet Dialer application. It comes with a manual too, written in simple "Apple Guide" language.*

*The math program that has set the standard for helping kids learn math is now bigger and better than ever before. Mega Math Blaster gives you enhanced arcade games, exclusive supplemental learning materials and, most important, more math fun. From Davidson.*

With all the quality education software now available for the Mac,® your kid's head can fill with knowledge faster than you can say "academic scholarship." And the nice thing is, you don't have to comb the Earth to find it. There's the completely '90s experience of buying it off the Internet. Or you can go through

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are trademarks or registered trademarks of their respective companies

ctually become smarter than they already are.

Shocking isn't it?

one of the very informative mail-order catalogs. Perhaps you want to get out of the house (no explanation is necessary). For that, there are a bunch of great stores like Best Buy and CompUSA. And if you can't tell by now, we're out to make finding excellent Mac software just as easy as using it. So let's review. If you want to become better educated on our incredible selection of software and all the different ways you can buy it, just pull up a chair at our web site, which is http://www.macsoftware.apple.com. **Or call 800-500-4862.**

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The microfilm was stuffed in his cheeks. If they made him talk, he would swallow and recover it later.
How long could he hold his breath before she would say yes? 2 minutes? maybe more.
Little did they know that the briefcase was stuffed with paper. Would they laugh or put a bullet through his head?
It's amazing what a great photo can do to the imagination.
With a PhotoDisc Starter Kit you'll have access to the most comprehensive collection of commercial-quality, royalty-free photographs. Shot by the finest photographers in the world. High-res images available on CD or online, 24 hours a day through our Web site. To order your Starter Kit call PhotoDisc direct at 1 800 528 3472 or visit us at www.photodisc.com. And get the kind of photos that people tell stories about.
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# Star Ratings

HARDWARE AND SOFTWARE PRODUCTS AT A GLANCE

*Macworld Star Ratings* lets you compare Macintosh products based on the authoritative assessments in our reviews and features. The number of stars indicates the product's level of quality; each product also gets a numeric score that provides a more exact assessment of the product's quality within that level. We evaluate seven factors to derive the Star Rating: feature set, design implementation, performance, reliability, ease of use, innovation, and value. We take these evaluations, weight their importance for each class of product, and calculate the final score. The higher the score, the better a product is, even among products with the same number of stars. The following list shows how the ratings and scores relate.

| | | |
|---|---|---|
| ★★★★★ | 9.0 to 10.0 | Outstanding |
| ★★★★ | 7.0 to 8.9 | Very Good |
| ★★★ | 5.0 to 6.9 | Good |
| ★★ | 3.0 to 4.9 | Flawed |
| ★ | 0.0 to 2.9 | Unacceptable |

This section also lists products that have been awarded an **Editors' Choice** designation in a *Macworld* product comparison.

If a product has been upgraded since our last assessment, the most recent version number appears in parentheses after the main reviewed version number. To read a full review of any product in the listing, please consult the issue indicated at the end of the listing or search for the product via Macworld Online (keyword *Macworld* on America Online; URL *http://www.macworld.com* on the World Wide Web).

Vendors: Please write to *Macworld Star Ratings*, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

## Software

### BUSINESS

★★★★/8.8 **4th Dimension 3.5,** ACI US, 408/252-4444, $895. Leading Mac database gets important improvements. *Mar 96, p. 60*

★★★★/8.4 **ClarisWorks 4.0,** Claris, 408/727-8227, $129 (estimated). Clean design puts the big boys to shame. *Jun 96, p. 98.* **Editors' Choice** for best integrated software. *Nov 95, p. 124*

★★★★★/9.5 **DeltaGraph 4.0,** DeltaPoint, 408/648-4000, $139.95. Top Mac graphing application still excels. *Sep 96, p. 90*

★★★★/8.2 **FileMaker Pro 3.0,** Claris, 408/727-8227, $199. FileMaker 3 is now relational and more useful than ever. *Apr 96, p. 56.* **Editors' Choice** for best database software. *Jun 96, p. 98*

★★★★/7.0 **GeoQuery 5.0,** GeoQuery, 313/944-9280, $295. Put your business data on the map. *Sep 96, p. 92*

★★★★/7.8 **Let's Keep It Simple Spreadsheet 1.0,** Casady & Greene, 408/484-9228, $189.95. New approach to spreadsheets uses graphical programming style. *Sep 96, p. 67*

★★★/6.9 **Micro Planner Manager 1.4,** Micro Planning International, 303/757-2216, $695. Project-management application takes scheduling seriously. *Jun 96, p. 65*

★★★★/7.1 **Microsoft Excel 5.0,** Microsoft, 206/882-8080, $339. The only game in town, but a glutton for RAM and disk space. *Jun 96, p. 98*

★★★/6.9 **Microsoft PowerPoint 4,** Microsoft, 206/882-8080, $295 (estimated). A solid, simple-to-use slide machine. *Jun 96, p. 98*

★★★/6.7 **Microsoft Word 5.1,** Microsoft, 206/882-8080, $320 (estimated). Fast, sleek, stable Mac word processor. *Jun 96, p. 98*

★★★/5.1 **Microsoft Word 6.0.1,** Microsoft, 206/882-8080, $295 (estimated). The most bloated word processor on earth may be mandatory in big corporations. *Jun 96, p. 98*

★★★★/7.2 **Minitab 10 Xtra,** Minitab, 814/238-3280, $895. Updated package offers a complete statistical tool kit. *Jun 96, p. 66*

★★★★/7.1 **OmniPage Pro 6.0,** Caere, 408/395-7000, $695. Flagged-text feature is indispensable and handles gray-scale graphics. *Jun 96, p. 54*

★★★★/7.1 **Panorama 3.0,** ProVue, 714/841-7779, $290 (estimated). Database program features easy forms and fast network abilities. *Jun 96, p. 98*

★★★/6.4 **Persuasion 3.0 (3.0.2),** Adobe Systems, 206/470-7000, $259 (estimated). Hard to use, but offers every presentation effect a pro could need. *Jun 96, p. 98*

★★★/6.4 **PowerBuilder 4.0 (5.0),** Powersoft, 508/287-1500, $2995. Cross-platform development tool comes to the Mac at last. *Aug 96, p. 71*

★★★★/7.7 **QuickBooks Pro 4.0,** Intuit, 415/944-6000, $189. Accounting package can be customized for your business. *Jun 96, p. 55*

★★★★/8.8 **Sculpt 2.0,** Interactive Simulations, 619/658-9462, $895. Molecular modeling at blazing speeds. *Oct 96, p. 84*

★★/4.2 **SoftWindows 3.0,** Insignia Solutions, 408/327-6000, $329. Slow, but useful for those places where Windows 3.1 still rules. *Sep 96, p. 58*

★★/4.3 **SoftWindows 95 1.0,** Insignia Solutions, 408/327-6000, $379. If you use PC software regularly, consider a hardware solution. *Sep 96, p. 58*

★★★★/7.0 **TextBridge Pro 3.0,** Xerox, 508/977-2000, $349. Easy to select and supports graphics, but does not flag unrecognized text. *Jun 96, p. 54*

★★★★/7.4 **WordPerfect 3.5,** Corel, 613/728-8200, $249. In speed, interface, and Mac integration, WordPerfect beats all competitors. *Jun 96, p. 98*

★★/4.0 **WorldWrite 3.0,** WorldSoft, 801/350-9490, $149. New word processor is promising but nothing to write home about. *Aug 96, p. 73*

### DESKTOP PUBLISHING

★★★★/8.7 **Adobe Type Manager 3.9,** Adobe Systems, 415/961-4400, $39.95. Accurately renders PostScript fonts at all sizes on screen and on any printer. *Apr 96, p. 102*

★★★/6.0 **MasterJuggler Pro 2.0,** Alsoft, 713/353-4090, $89.95. MasterJuggler wants to be your favorite font manager. *Sep 96, p. 72*

★★★★/7.0 **PageTools 2.0,** Extensis, 503/274-2020, $99.95. Plug-ins add power and precision to PageMaker. *May 96, p. 65*

★★★/6.1 **Ready,Set,Go 7.0.2,** Abbott Systems, 914/747-3116, $395. Revamped page-layout software offers more than the basics. *Sep 96, p. 83*

★★★/6.1 **Suitcase 3.0.1,** Symantec, 503/334-6054, $69.95. Font manager vies with MasterJuggler for superiority, and still no clear winner. *Sep 96, p. 72*

★★★★/8.9 **SuperATM 3.9,** Adobe Systems, 415/961-4400, $69. ATM's PostScript font rendering plus intelligent substitution of missing fonts. *Apr 96, p. 102*

★★★/5.3 **UniQorn 1.01,** SoftPress Systems Limited, 415/331-4820, $895. Page-layout program has QuickDraw GX support—but not much else. *Aug 96, p. 56*

★★★/5.1 **Xdream 1.0,** Vision's Edge, 904/386-4573, $99. These 24 tools range from useful to indispensable. *Jun 96, p. 50*

★★★★/7.1 **XPert Tools 1.0,** XChange, 415/864-7592, $99 to $169. XPert Tools takes you beyond Quark's feature set. *Jun 96, p. 50*

### EDUCATION/ENTERTAINMENT

★★★★/8.8 **Bad Mojo 1.0,** Pulse Entertainment, 310/264-5579, $54.95. Want to be a fly on the wall? *Sep 96, p. 96*

★★/3.8 **Chaos 1.0,** HarperCollins Interactive, 212/207-7000, $49.95. High-concept CD-ROM game is low on entertainment. *Sep 96, p. 100*

★★★/6.2 **Cliffs StudyWare for Algebra I,** Cliffs Notes, 402/423-5050, $39.98. Algebra tutorial makes poor use of multimedia. *Jul 96, p. 76*

★★★★/7.1 **College Advisor,** Princeton Review Pub-

*continues*

# Star Ratings

lishing, 617/272-7027, $19.95. Help with one of life's big choices. *Aug 96, p. 84*

★★★★/7.2 **Connections,** Discovery Channel Multimedia, 301/986-0444, $39.95. Ideas and entertainment link up in this game. *Aug 96, p. 88*

★★★★/8.4 **JMP In 1.0,** Duxbury Press, 800/354-9706 (U.S. only), $54. Student version of stats heavyweight sets the standard. *Jul 96, p. 79*

★★★/5.3 **A Little Kidmusic,** Ars Nova, 206/889-0927, $75. Short on theory, long on entertainment. *Aug 96, p. 75*

★★★★/8.5 **Logical Journey of the Zoombinis 1.0,** Brøderbund, 415/382-4400, $40. A different kind of math program helps kids develop logical thinking skills. *Jul 96, p. 78*

★★/3.5 **Quest for Fame 1.0,** Virtual Music Entertainment, 508/688-8800, $48.95. Game's execution is disappointing, but otherwise it has a lot going for it. *Oct 96, p. 88*

★★★/5.3 **Total Distortion 1.0,** Pop Rocket, 415/242-2158, $39.95. A labored mix of interactivity and music videos. *Jul 96, p. 64*

★★★★/7.7 **Toy Story Animated StoryBook 1.0,** Disney Interactive, 800/900-9234, $37.95. Sets a 3-D standard for interactive tales. *Sep 96, p. 94*

★★★★/7.1 **Wing Commander IV,** Origin/Electronic Arts, 512/434-4263, $50. Minor improvements to a classic game. *Oct 96, p. 89*

## GRAPHICS

★★/4.9 **3D World 1.0,** Microspot USA, 408/253-2000, $139. Affordable but limited QuickDraw 3D design tool. *Jul 96, p. 74*

★★★★/7.1 **Adobe Illustrator 6.0,** Adobe Systems, 415/961-4400, $595. Tweaks aren't enough to surpass FreeHand 5.5. *Apr 96, p. 54*

★★★★/8.5 **Adobe Photoshop 3.0.5,** Adobe Systems, 415/961-4400, $895. Single most significant and capable image editor. *Jun 96, p. 78*

★★★★/7.9 **The Black Box 2.0,** Alien Skin Software, 919/832-4124, $119. Straightforward Photoshop filters for creating drop shadows, bevels, and glass refraction effects. *Sep 96, p. 120*

★★★★/7.7 **Bryce 2,** MetaTools, 805/566-6200, $299. Create awe-inspiring, photorealistic 3-D landscapes. *Aug 96, p. 59*

★★★/6.1 **Bump 1.0,** AtoZ Software, *atozsoft@aol.com*, $49. Photoshop filter applies shadows and highlights. *Sep 96, p. 120*

★★★/6.8 **Chris' Filters 1.0,** Chris Cox, *cc4b@andrew.cmu.edu*, shareware. Photoshop filters enhance productivity with a few special effects. *Sep 96, p. 120*

★★★/6.9 **Cumulus 2.5,** Canto Software, 415/905-0300, $1795. Turn your multimedia archives into a network image database. *Aug 96, p. 55*

★★★★/8.0 **CyberMesh 1.11,** Knoll Software, 415/453-2471, $49. Exports Photoshop gray-scale images as 3-D DXF models. *Sep 96, p. 120*

★★★★/7.7 **Extreme 3D 1.0,** Macromedia, 415/252-2000, $699. MacroModel weds Three-D, lives happily ever after. *Jul 96, p. 60*

★★★★/7.5 **Form-Z RenderZone 2.8,** Autodessys, 614/488-9777, $1995. Impressive 3-D modeler gets rendering know-how. *Oct 96, p. 75*

★★★/6.5 **Gallery Effects 1.0,** Adobe Systems, 415/961-4400, $99. Useful edge-enhancement and texture Photoshop filters priced to sell. *Sep 96, p. 120*

★★★★/7.4 **Intellihance 2.0.1,** Extensis, 503/274-2020, $99.95. Photoshop plug-in automates improving scanned images. *Sep 96, p. 120*

★★★★/8.3 **Kai's Power Tools 3.0.2,** MetaTools, 805/566-6200, $199. Excellent Photoshop gradient and distortion filters with a fanciful, sometimes bizarre interface. *Sep 96, p. 120*

★★★★/7.5 **KPT Convolver 1.0,** MetaTools, 805/566-6200, $199. Provides an infinite range of focus, edge-detection, and color-embossing Photoshop effects. *Sep 96, p. 120*

★★★/6.9 **KPT Cool Effects 1.0,** MetaTools, 805/566-6200, $29. "Kai's Power Tools Lite" at a bargain price. *Aug 96, p. 88*

★★★★/7.4 **Kwick Mask, Create B/W, and Rotate Color 1.0,** Hugh Kawahara, *http://www.stanford.edu/~*, freeware. Adobe Photoshop filters preview effects directly inside the image window. *Sep 96, p. 120*

★★★★/7.2 **Live Picture 2.5,** Live Picture, 408/464-4200, $995. Innovative image editor boasts many improvements. *Jun 96, p. 78*

★★★/6.9 **Lumpy Noise 1.0,** Paul Badger, *pbadger@cgrg.ohio-state.edu*, freeware. Free Photoshop plug-in applies a coating of thick, chunky noise. *Sep 96, p. 120*

★★★★/8.1 **Macromedia FreeHand 5.5,** Macromedia, 415/252-2000, $595. Draw program outperforms competitor, for now. *Feb 96, p. 74*

★★★★/7.7 **Paint Alchemy 2.0,** Xaos Tools, 415/487-7000, $99. Photoshop filter applies brushstrokes to create impressionistic effects. *Sep 96, p. 120*

★★★★/8.9 **Painter 4.0,** Fractal Design, 408/688-5300, $549. Painting and special-effects capabilities simply can't be beat. *Jun 96, p. 78*

★★★/6.5 **PhotoLab 1.2,** Cytopia Software, 415/364-4594, $99.95. Color-correction filters take up where Photoshop leaves off. *Sep 96, p. 120*

★★★★/7.7 **PhotoMatic 2.0.1,** DayStar Digital, 770/967-2077, freeware. Photoshop filter adds batch processing and AppleScript support. *Sep 96, p. 120*

★★★/6.9 **PhotoNavigator 1.0,** Extensis, 503/274-2020, freeware. Photoshop filter provides thumbnail views for quick scrolling. *Sep 96, p. 120*

★★★/6.2 **PlateMaker 1.0.2,** A Lowly Apprentice Productions, 619/438-5790, $295. Photoshop filter exports CMYK with spot-color channels to DCS 2.0 format. *Sep 96, p. 120*

★★★★/7.0 **Sculpt 3D 4.1 (4.1.2),** Byte by Byte, 512/305-0360, $495. High-end 3-D for the mainstream. *Sep 96, p. 81*

★★★★/8.2 **Series 2, 3-D Filter 2.11,** Andromeda Software, 805/379-4105, $129. Photoshop filter projects images onto three-dimensional cubes, spheres, and cylinders. *Sep 96, p. 120*

★★★★★/9.2 **Series 3, Screens Filter 1.4,** Andromeda Software, 805/379-4105, $159. Converts Photoshop images into alternative halftone patterns. *Sep 96, p. 120*

★★★★/8.2 **Stylist 1.0,** Alien Skin Software, 919/832-4124, $199. Plug-in adds graphic and text style sheets to Illustrator. *Oct 96, p. 64*

★★★/6.6 **Sucking Fish 1.01,** Naoto Arakawa, *gca00443@nittyserve.or.jp*, freeware. Offbeat, undocumented Photoshop gradient and pattern filters. *Sep 96, p. 120*

★★★/6.8 **Terrazzo 1.0,** Xaos Tools, 415/487-7000, $199. Photoshop filter repeats images to create seamless, organic pattern. *Sep 96, p. 120*

★★/3.7 **Tropix 2.0.5,** Alaras, 919/544-1228, $4990. Image database tames chaotic files—but not always successfully. *Aug 96, p. 55*

★★★★/7.5 **TypeCaster 1.0,** Xaos Tools, 415/487-7000, $199. Adds three-dimensional text to any Photoshop image. *Sep 96, p. 120*

★★★/6.3 **xRes 2.0,** Macromedia, 415/252-2000, $699. Although fast, and easy to learn, this image editor has room for improvement. *Jun 96, p. 78*

## INTERNET/NETWORKING

★★★★/7.1 **3D Web Workshop 1.0,** Specular International, 413/253-3100, $249. Instant Internet presence in 3-D. *Oct 96, p. 68*

★★★★/7.0 **AppleScript 1.1,** Apple Computer, 408/996-1010, free. Standout CGI scripting tool is built into System 7.5. *Oct 96, p. 104*

★★/4.6 **Arachnid 1.6,** University of Iowa, *robert-mcburney@uiowa.edu*, free. HTML editor helps you manages your site as a whole. *Oct 96, p. 114*

★★★/5.4 **BBEdit 4.0 (4.01),** Bare Bones Software, 508/651-3561, $119. BBEdit is a useful tool for any active Webmaster. *Oct 96, p. 114*

★★★★/7.0 **BeyondPress 2.0,** Astrobyte, 303/534-6344, $595. XPress-to-HTML conversion program whisks you from XPress to the Internet. *Oct 96, p. 57*

★★★/6.5 **Butler SQL 2.0.2,** EveryWare Development, 905/819-1173, $695. SQL database is well suited for serving data over the Internet. *Oct 96, p. 104*

★★★/5.5 **cc:Mail Mobile for Macintosh 2.0,** Lotus Development, 617/577-8500, $195. Speedy and straightforward choice for PC-centric environments, but lacks many features competitors offer. *Oct 96, p. 134*

★★★★/8.6 **Claris Emailer 1.03,** Claris, 408/987-7000, $49 (estimated). The only application that dumps (almost) all of your messages in one in-box. *Oct 96, p. 134.* **Editors' Choice** for best E-mail over the Internet.

★★★/6.9 **Cyberdog 1.0,** Apple Computer, 408/996-1010, free. Internet tools are an interesting but incomplete showcase for OpenDoc. *Sep 96, p. 56*

★★★★/8.1 **Electronic Commerce Suite 2.0 (2.1),** iCAT, 206/623-0977, $1495-$4995. Builds complex yet robust Web sites quickly and easily. *Oct 96, p. 104.* **Editors' Choice** for best software for building dynamic Web sites.

★★★/6.6 **Eudora Pro 2.1.2,** Qualcomm, 619/587-1121, $89. Fast and reliable, with good message-handling features, but poor address-book features. *Oct 96, p. 134*

★★★★/7.8 **Excel Internet Assistant 1.0,** Microsoft, 206/882-8080, free. Convert existing Excel files to HTML. *Oct 96, p. 114*

★★★★/8.1 **FirstClass 3.11,** SoftArc, 905/415-7000, $495 to $1495. Offers robust E-mail, conferencing, and other features, yet easy to use. *Oct 96, p. 134.* **Editors' Choice** for best company-wide E-mail.

★★★/6.7 **GlobalTransfer 1.0,** Global Village, 408/523-1000, $29.95. Allows direct file transfers without the complexity of telecommunications software; easy to send and receive files. *Oct 96, p. 82*

★★★/6.1 **GNNPress 1.1 (1.2),** PrimeHost, 800/879-6882, $199/month for commercial site. Combines a powerful HTML editor with a site-management tool. *Oct 96, p. 114*

★★★/5.6 **HexWeb XT 2.0,** HexMac International, 415/864-7592, $349. XPress-to-HTML conversion program whisks you from XPress to the Internet. *Oct 96, p. 57*

★/2.9 **HoTMetaL Pro 2.0,** SoftQuad, 416/239-4801, $159. Web editor just doesn't cut the mustard. *Oct 96, p. 114*

★★/3.8 **HTML Author 1.0,** Adobe Systems, 415/961-4400, included with PageMaker 6.0. Plug-in converts PageMaker files to HTML. *Oct 96, p. 114*

★★★★/7.9 **HTML Editor 1.1.4,** Rick Giles, *rick.giles@acadiau.ca*, $25. Text editor is a great all-around HTML coding aid. *Oct 96, p. 114.* **Editors' Choice** for best Web authoring tools.

★★★/6.8 **HVS Color 1.2,** Digital Frontiers, 847/328-0880, $99. Keep Web graphics small, colors true. *Oct 96, p. 72*

*continues*

# Welcome to the Revolution!

## Introducing Fractal Design Expression™ - The Revolutionary Natural-Media™ Vector Drawing Program.

Expression redefines digital drawing by combining the stylistic **expressiveness of traditional artist's tools** with the speed, editability and resolution independence of a vector drawing program. Expression will **change the way you think** about vector drawing. Here's why:

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- Your drawing palette now includes **over 350 built-in stroke styles,** plus you can create your own strokes.
- Capture the elegance of traditional art materials with Natural-Media strokes including vector-based transparency.
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# Star Ratings

★★★/6.5 **LAN Commander**, Power On Software, 612/879-9190, $299.95. Network management made simple. *Oct 96, p. 79*

★★/3.1 **LANScape SNMP 2.1**, Sonic Systems, 408/736-1900, $799. SNMP console sports some sophisticated features, but needs work. *Jul 96, p. 74*

★★★/6.2 **MacHTPL 2.2.2**, Tim Endres, *time@ice.com*, free. Preprocessor can help you tailor your HTML for specific browsers. *Oct 96, p. 104*

★★★/6.3 **MacPerl 5.0.6**, Matthias Neeracher, *neeri@iis.ee.ethz.ch*, free. CGI scripting language is portable to other platforms. *Oct 96, p. 104*

★★★★/7.4 **Navigator 2.0**, Netscape Communications, 415/528-2555, $49 to $69. Netscape pushed beyond Web browsing. *May 96, p. 50*

★★★/5.6 **NetCloak 2.0**, Maxum Development, 708/830-1113, $195. Adds 30 commands to those you use in HTML documents. *Oct 96, p. 104*

★★★/6.5 **NetForms 2.0**, Maxum Development, 708/830-1113, $195. Forms-processing aid is simple to install and use. *Oct 96, p. 104*

★★★/6.7 **PageMill 1.02**, Adobe Systems, 415/961-4400, $99. WYSIWYG HTML editor does its job with reliability and flair. *Oct 96, p. 114*

★★★/6.3 **QuickMail 3.6**, CE Software, 515/221-1801, $199 to $1449. Easy to use, but message-tracking features are limited. *Oct 96, p. 134*

★★★/6.3 **SiteMill 1.0.3**, Adobe Systems, 415/961-4400, $595. Powerful management tool for your Web site. *Oct 96, p. 114*

★★★/6.6 **Tango 1.5**, EveryWare Development, 905/819-1173, $495. CGI program forwards queries to a SQL database and reformats the responses into HTML. *Oct 96, p. 104*

★★★★/7.3 **Tango for FileMaker Pro 3.0**, EveryWare, 905/819-1173, $349. Tool kit for putting your FileMaker database on the Web. *Oct 96, p. 59*

★★★/6.7 **Tapestry 1.1 (2.0)**, Concept 1, 905/305-8655, $69. Beginners get help weaving the perfect Web site. *Oct 96, p. 80*

★★★★/7.2 **TeleFinder 5.0**, Spider Island, 714/453-8095, $675. BBS software understands the Net. *Aug 96, p. 65*

★★★/5.5 **Timbuktu Pro for Networks 2.0**, Farallon Computing, 510/814-5000, $139 to $3999. Despite drawbacks, it's almost like being there. *Oct 96, p. 134*

★★★★/7.4 **Tumbleweed Publishing Essentials 1.0**, Tumbleweed Software, 415/363-7022, $695. A faster, cheaper alternative to Acrobat. *Oct 96, p. 70*

★/1.0 **WebDoor 1.2**, Open Door Networks, 541/488-4127, $20-60/month. Authoring software is abysmal. *Oct 96, p. 114*

★★★★/7.9 **Webmaker 2.2**, Harlequin, 617/374-2400, $99. For converting FrameMaker documents to the Web, WebMaker has no equal. *Oct 96, p. 114*. **Editors' Choice** for best Web authoring tools.

★★★★/7.8 **Word Internet Assistant 1.0**, Microsoft, 206/882-8080, free. Convert existing Word files to HTML. *Oct 96, p. 114*

## MEDIA

★★★★/7.4 **Adobe Premiere 4.2**, Adobe Systems, 415/961-4400, $795. Video editor offers significant enhancements. *Mar 96, p. 90*

★★★★/7.1 **Apple Media Tool 2.0**, Apple Computer, 408/996-1010, $495. Easy for simple interactivity, but advanced features require add-on products. *Aug 96, p. 100*

★★★★/7.1 **Authorware 3.5**, Macromedia, 415/252-2000, $4999. Authorware offers great features and usability but is very costly. *Aug 96, p. 100*

★★/3.9 **Digital Box Office 1.0**, PowerProduction Software, 310/937-4411, $599. Combines object- and timeline-oriented authoring, but has an awkward interface. *Aug 96, p. 100*

★★★/6.8 **The Digital Chisel 2.0.1c (2.1)**, Pierian Springs Software, 503/222-2044, $159. Strong student-tracking features, but a poor Undo command. *Aug 96, p. 100*

★★★★/7.2 **Director 5.0**, Macromedia, 415/252-2000, $1199. Multimedia authoring tool gets polish and a performance boost. *Jul 96, p. 52*. **Editors' Choice** for best authoring programs. *Aug 96, p. 100*

★★★★/8.3 **Final Effects AP 1.0**, MetaTools, 805/566-6200, $199. Add cool video effects to Adobe Premiere. *Aug 96, p. 86*

★★★★/7.0 **HyperStudio 3.1**, Roger Wagner Publishing, 619/442-0522, $199.95. Easy and powerful but weak student-tracking options. *Aug 96, p. 100*. **Editors' Choice** for best authoring programs.

★★★★/7.0 **mTropolis 1.0 (1.1)**, mFactory, 415/548-0600, $1195. Fast and easy to implement most interactivity; but limited text support. *Aug 96, p. 100*

★★★/6.8 **Oracle Media Objects 1.0.5.4 (1.1)**, Oracle, 415/506-7000, $495. Good interface and multiplatform support, but requires too much scripting. *Aug 96, p. 100*

★★★★/7.0 **Special Delivery 2.1**, Interactive Media, 415/948-0745, $259. Easy to use, but lacks hypertext. *Aug 96, p. 100*. **Editors' Choice** for best authoring software.

★★★★/7.2 **Studio Vision Pro 3.0.3**, Opcode Systems, 415/856-3333, $995. For MIDI-audio conversion, this audio program is the one to buy. *Sep 96, p. 76*

★★★★/7.1 **SuperCard 2.5.2**, Allegiant Technologies, 619/587-0500, $595. Superb resource-management and interface support, but can be sluggish. *Aug 96, p. 100*. **Editors' Choice** for best authoring software.

## PRODUCTIVITY

★★★/5.1 **ACT for Macintosh 2.5.1**, Symantec, 541/334-6054, $199.95. A weak offering in the field of PIM software. *Jul 96, p. 62*

★★/4.8 **ACT for Newton 1.0**, Symantec, 541/334-6054, $119.95. Only die-hard fans of the desktop version could love this portable PIM. *Jul 96, p. 62*

★★★/6.8 **Claris Organizer 1.0**, Claris, 408/987-7000, $49 (estimated). Simple little PIM is fast, easy to learn, and intelligently designed. *Jun 96, p. 106*

★★★/6.9 **DateBook Pro 4.2**, Now Software, 503/274-2800, $69.95 (estimated). A well-designed but often sluggish calendar and scheduling program. *Jun 96, p. 106*

★★★/5.2 **Full Contact 3.0**, Pitch Software, 408/374-5504, $169. Resurrected PIM has been improved—but not enough. *Jun 96, p. 70*

★★★★/7.0 **In Control 4.0**, Attain, 617/776-1110, $85. Outline-based PIM adds Net links. *Aug 96, p. 63*

★★★/6.9 **InTouch 2.5.2**, Prairie Group, 515/225-3720, $49.95. Simple contact manager doesn't force you to plug data into designated slots. *Jun 96, p. 106*

★★★★/8.3 **Quicken Deluxe 6**, Intuit, 520/295-3220, $69.95. The best-selling package gets bigger and mostly better. *Feb 96, p. 65*

★★★/6.8 **TouchBase Pro 4.2**, Now Software, 503/274-2800, $69.95 (estimated). Slow, but offers up to 16 custom fields. *Jun 96, p. 106*

## PROGRAMMING

★★★/6.9 **Cafe DR1**, Symantec, 541/334-6054, $99.95. Java development environment needs

*continues*

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# Star Ratings

crash-proofing and a faster code-development cycle. *Oct 96, p. 54*

★★★/6.8 **Discover Programming with Java (subset of CodeWarrior 9) 1.0,** Metrowerks, 512/873-4700, $99. Java module popped into CodeWarrior 9 offers a familiar interface. *Oct 96, p. 54*

★★★/6.9 **FutureBASIC II,** Staz Software, 601/255-7085, $229. Complete friendly BASIC programming environment but no Power Mac support. *Jul 96, p. 81*

★★★★/7.6 **Roaster DR2.1,** Natural Intelligence, 617/876-4876, $129. Java development environment puts daylight between itself and its rivals. *Oct 96, p. 54*

★★★★/8.0 **VIP C 2.0,** Mainstay, 805/484-9400, $495. Impressive update of slick coding tool. *Jul 96, p. 80*

★★★/6.6 **Visual C++ Cross-Development Edition 4.0,** Microsoft, 800/426-9400, $1999. Program in Windows, port effortlessly to the Mac. *Jul 96, p. 71*

## UTILITIES

★★★/5.3 **Adobe File Utilities 1.0,** Adobe Systems, 415/961-4400, $149. Mac utilities work well but are unnecessary for many Mac users. *Aug 96, p. 62*

★★★★★/9.4 **Conflict Catcher 3.0.1 (3.0.4),** Casady & Greene, 408/484-9228, $99.95. The perfect tool for managing extensions. *Jun 96, p. 106*

★★/3.9 **Faxstf 3.2,** STF Technologies, 816/463-1412, $99 to $719.95. Faxing application suffers from its revision. *Oct 96, p. 66*

★★★★/8.2 **Here & Now 2.0,** Software Architects, 206/497-0122, $99.95. The best choice for helping Win95 files work with the Mac. *Sep 96, p. 60*

★★★★/8.5 **HSM ToolKit 1.0,** FWB, 415/325-4392, $79. Infinite storage made infinitely more simple. *Oct 96, p. 77*

★★★/5.6 **LaserMerge Electronic Paper 2.0,** MindGate Technologies, 615/937-6800, $95. Souped-up printing utility multiplies your output options. *Sep 96, p. 87*

★★★/5.9 **Mac Drive 95 1.0,** Media4, 515/225-7409, $79.95. Acceptable, if inelegant, file sharing with Windows 95. *Sep 96, p. 60*

★★★/6.7 **MacOpener 2.0,** DataViz, 203/268-0030, $50. File-transfer utility's reliance on DOS extensions is disappointing. *Sep 96, p. 60*

★★★/6.7 **MacTools Pro 4.0,** Symantec, 541/334-6054, $114. A respectable troubleshooting and data-recovery program for a reasonable price. *Jun 96, p. 106*

★★★/6.8 **MacTransfer 1.0,** Insignia Solutions, 408/327-6000, $49. A solid choice for cross-platform file exchanges. *Sep 96, p. 60*

★★★/6.8 **Norton Utilities 3.2,** Symantec, 541/334-6054, $129. Easy-to-use tool kit works wonders. *Jun 96, p. 106*

★★★/6.4 **Now Utilities 6.0,** Now Software, 503/274-2800, $89.95. A good collection of utilities, but a mediocre upgrade. *Aug 96, p. 59*

★★★★/7.4 **QuicKeys 3.0.1,** CE Software, 515/221-1801, $119. Hands-down winner for an easy way to automate repetitive tasks. *Jun 96, p. 106*

★★★/5.7 **SAM 4.0.8,** Symantec, 541/334-6054, $99. SAM finds viruses, kills 'em. *Jul 96, p. 72*

★★★★/8.9 **Speed Doubler 1.0.2 (1.3),** Connectix, 415/571-5100, $99. Connectix makes a Power Mac's 680X0 emulation feel native. *Feb 96, p. 56*

★★★★/7.3 **StuffIt Deluxe 4.0,** Aladdin Systems, 408/761-6200, $129.95. Same compression format, but faster and with a brilliant Finder twist. *Oct 96, p. 61*

★★★/6.9 **Tempo II Plus 3.0.9 (3.0.9A),** Affinity Microsystems, 303/442-4840, $179.95. Powerful macro program suffers from undue complexity. *Jun 96, p. 106*

★★★/5.1 **TransferPro 1.0,** Digital Instrumentation Technology, 505/662-1459, $189. File-transfer capabilities need to work better in the Windows 95 world. *Sep 96, p. 60*

★★/3.7 **XChange 1.2 (1.3),** Optima Technologies, 714/476-0515, $49. Cross-platform transfer capabilities are a buggy disappointment. *Sep 96, p. 60*

★★★★/8.1 **XTen 6.0,** Tenon Intersystems, 805/963-6983, $350. A speed demon, but only if you're a Unix guru. *May 96, p. 108.* **Editors' Choice** for best X Window server software.

# Hardware

## MISCELLANEOUS HARDWARE

★★★/5.1 **Apple Color OneScanner 600/27,** Apple Computer, 408/996-1010, $629. This new version has little to offer. *Jul 96, p. 54*

★★★★/7.0 **Apple MessagePad 130,** Apple Computer, 408/996-1010, $695. Apple adds backlighting to the Newton. *Aug 96, p. 78*

★★★/6.5 **Color QuickCam 1.0 (2.0),** Connectix, 415/571-5100, $299. Low-cost camera for passable digital video. *Sep 96, p. 79*

★★/4.6 **Fujix DS-220,** Fuji, 914/789-8100, $1200. Digital camera misses the mark. *Sep 96, p. 85*

★★★/6.3 **HP ScanJet 4p,** Hewlett-Packard, 408/246-4300, $615. High price and slow scan times; a mediocre choice. *Jul 96, p. 54*

★★★/6.8 **Kodak Digital Science DC50 Zoom Camera,** Eastman Kodak, 716/724-4000, $1000. Camera combines zoom and autofocus with good color and detail. *Jul 96, p. 57*

★★/4.2 **MagicLink PIC-2000,** Sony, 408/432-1600, $899. PDA has readable screen and built-in modem but it's too large. *Jul 96, p. 102*

★★★/6.6 **PageOffice,** Umax Technologies, 510/651-4000, $349. Personal page scanner shortchanges Mac users. *Jun 96, p. 58*

★★★★/7.8 **Polaroid PDC-2000,** Polaroid, 716/256-4436 ext. 868, $3695 as tested. New breed of camera creates output as cool as its hardware. *Aug 96, p. 52*

★★/4.2 **Psion Series 3a,** Psion, 508/371-0310, $595. PDA has good software but an awkward L-shape when open. *Jul 96, p. 102*

★★★★/8.4 **Umax Vista-S6E,** Umax Technologies, 510/651-4000, $445. A clear best buy for a quality desktop scanner. *Jul 96, p. 54*

★★/4.8 **Zaurus ZR-5000,** Sharp, 201/529-8200, $499. Easy-to-carry PDA offers decent graphics tools, but no handwriting recognition. *Jul 96, p. 102*

## MODEMS/NETWORK

★★★/6.3 **28.8 CruiseCard,** Megahertz, 801/320-7000, $269. Economical PC Card modem with good performance but low connect (reliability) rates. *Jul 96, p. 141*

★★/4.8 **Communicard 28.8,** Dayna Communications, 801/269-7200, $359 to $416 (estimated). Expensive PC Card modem, without digital line protection frequently found in similar cards. *Jul 96, p. 141*

★★★/6.0 **DF2814,** TDK Systems, 916/478-8421, $379. Low price, but PC Card modem was bogged down by JPEG file transfer. *Jul 96, p. 141*

★★★/5.4 **EFM 288XJ,** Epson America, 310/782-0770, $299. Fast PC Card modem, but with a low call-connect (reliability) score. *Jul 96, p. 141*

*continues*


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# Star Ratings

★★★/6.2 **Mac Class 288 V.34**, Practical Peripherals, 770/840-9966, $149. PC Card modem has acceptable performance with a nice price. *Jul 96, p. 141*

★★★/5.4 **Mobile Plus Macintosh**, Apex Data, 510/623-1231, $224-$272. PC Card modem has a long five-year warranty, but not much else. *Jul 96, p. 141*

★★★/6.6 **Optima 288 V.34**, Hayes Microcomputer Products, 770/441-1617, $299. PC Card modem is an excellent performer with a great price and warranty. *Jul 96, p. 141*

★★★/6.9 **Pacesetter**, ADC Kentrox, 503/643-1681, $1195. Versatile, easy-to-configure router for ISDN or frame-relay connections. *Sep 96, p. 70*

★★★★/8.0 **PowerPort Platinum PC Card**, Global Village Communication, 408/523-1000, $379-$599. A complete, well-conceived mobile communications package for the Macintosh. *Jul 96, p. 141.* **Editors' Choice** for best PC card modems.

★★★/5.4 **SafeJack 28.8**, Angia Communications, 801/371-0488, $279. Lifetime warranty for this PC Card modem, but no bundled software. *Jul 96, p. 141*

★★/4.3 **SmartLink V.34 2834 PCA**, Archtek America, 818/912-9800, $299. PC Card modem has no Mac documentation. *Jul 96, p. 141*

★/2.6 **Smart One 2834VLXMac**, Best Data Products, 818/773-9600, $269. This voice modem is not a smart choice. *Jun 96, p. 76*

## PRINTERS

★★★/5.7 **4039 10plus**, Lexmark, 606/232-2000, $1249. Fast on text, but low Postscript emulation; high-quality output; expensive. *Sep 96, p. 181*

★★★/6.9 **Apple Color StyleWriter 1500**, Apple Computer, 408/996-1010, $289. Low-cost color ink-jet offers a bargain-priced option. *Jul 96, p. 59*

★★★★/7.5 **Apple Color StyleWriter 2500**, Apple Computer, 408/996-1010, $389. Color ink-jet has quality and speed for small-office users. *Jul 96, p. 59*

★★★★/7.2 **Digital Science 8650 PS**, Eastman Kodak, 800/235-6325, $10,795 plus $995 for Ethernet. Top performance and solid image quality highlight Kodak's newest dye-sub printer. *Oct 96, p. 60*

★★★/5.9 **HP LaserJet 5M**, Hewlett-Packard, 408/246-4300, $2229. A good workgroup printer gets better. *Jul 96, p. 56*

★★★★/7.1 **HP LaserJet 5MP**, Hewlett-Packard, 408/246-4300, $1299. Consistently quick performance and high-quality output. *Sep 96, p. 181.* **Editors' Choice** for best personal laser printers.

★★★/6.5 **HP LaserJet 5Si MX**, Hewlett-Packard, 408/246-4300, $4899. Pricey, but offers top speed and quality. *Jun 96, p. 116.* **Editors' Choice** for best workgroup printers.

★★★/5.6 **LaserWriter 4/600 PS**, Apple Computer, 408/996-1010, $929 (estimated). Slow but good text and adequate graphics output. *Sep 96, p. 181*

★★★/5.8 **LaserWriter 12/640 PS**, Apple Computer, 408/996-1010, $1599 to $1829. Workgroup printer is slower—but cheaper—than HP's LaserJet 5M. *Oct 96, p. 62*

★★★/6.5 **microLaser Pro/8**, Texas Instruments, 800/848-3927, $1169. Speedy performance, but poor-quality graphics output. *Sep 96, p. 181*

★★/4.9 **OL610e/PS**, Okidata, 609/235-2600, $949. Middling performance; poor text and graphics output quality. *Sep 96, p. 181*

★★★/6.1 **OL810e/PS**, Okidata, 609/235-2600, $1439 list, $1250 street. Quick performance; excellent text but poor graphics output. *Sep 96, p. 181*

★★/4.3 **Personal LaserWriter 300**, Apple Computer, 408/996-1010, $652 (estimated). Slow performance, grainy output, low price. *Sep 96, p. 181*


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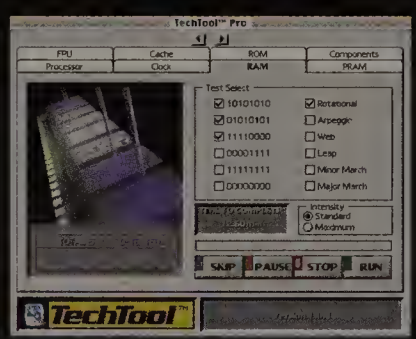

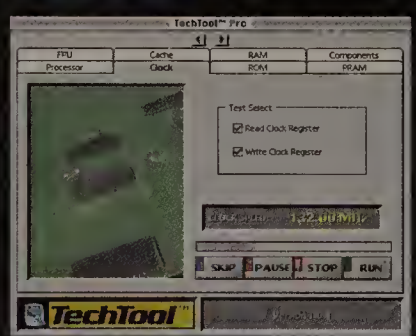

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MICROMAT COMPUTER SYSTEMS

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## STORAGE

★★★★/7.6 **2.6GB Optical**, La Cie, 503/520-9000, $1999. Low price for this format, great software, and uses high-performance Sony mechanism. *Oct 96, p. 141.* **Editors' Choice** for best optical drives.

★★/4.9 **3200**, Seagate, 714/252-7800, $339. The price is right, but this drive unfortunately uses the noisy, slow Travan technology. *Aug 96, p. 143*

★★★/6.2 **640MB MO Optical**, La Cie, 503/520-9000, $599. Decent performance, low media cost; but no performance match for Iomega's Jaz drive. *Oct 96, p. 141*

★★★★/7.2 **APS PD4**, APS Technologies, 816/483-1600, $499.95. Excellent low-priced, small-footprint unit, bundled with APS PowerTools, PowerCD. *Oct 96, p. 141.* **Editors' Choice** for best optical drives.

★★★/5.9 **Cheetah Plus**, Plasmon Data, 408/474-0100, $2575. Minimal documentation, mediocre performance reduce this drive's appeal. *Oct 96, p. 141*

★★★★/7.4 **DisKovery 2600MO**, Optima Technology, 714/476-0515, $2395. Reasonable price, great software, and uses a high-performance Sony mechanism. *Oct 96, p. 141*

★★★/6.7 **EZFlyer 230MB**, SyQuest, 510/226-4000, $299. SyQuest's new removable drive tries (again) to outzip Iomega. *Oct 96, p. 56*

★★★/5.4 **HammerDisk 230**, FWB, 415/325-4392, $769. Overpriced; uses older, slow technology. *Oct 96, p. 141*

★★★/6.7 **Hammer PE 2000**, FWB, 415/325-4392, $1079. For the fastest performance, the Hammer PE 2000 is the choice. *Jun 96, p. 153.* **Editors' Choice** for best 1.0GB to 2.5GB hard drive.

★★★/5.0 **HP SureStore Optical 2600FX**, Hewlett-Packard, 970/635-1000, $2995. Poor performance in its class, a lead brick of a case, and overpriced. *Oct 96, p. 141*

★★★★/8.3 **Jaz Drive**, Iomega, 801/778-1000, $599.95. Iomega thinks big with Zip's new sibling. *Jun 96, p. 48*

★★/4.9 **LF-7300A**, Panasonic Communications & Systems, 201/348-7000, $2995. Overpriced and slow; it can't compete with a 2.6GB MO drive. *Oct 96, p. 141*

★★★/6.9 **PD/CD**, Plasmon Data, 408/474-0100, $620. This dual-purpose drive is worth considering if you need a CD-ROM drive. *Oct 96, p. 141*

★★★/5.2 **PD/CD-ROM**, Panasonic Communications & Systems, 201/348-7000, $649.95. Nonstandard SCSI connectors, DIP SCSI ID settings, and poor documentation bring this drive down. *Oct 96, p. 141*

★★★★/7.0 **PDC 2400**, ProDirect, 612/941-1805, $800. 2.4GB drive is tops for speed, value, and design. *Jun 96, p. 153.* **Editors' Choice** for best 1.0GB to 2.5GB hard drive.

★★★/6.4 **Phasewriter Dual PD**, Toray Marketing & Sales, 415/341-7152, $649 (estimated). Neither price nor performance can keep pace with the competition's. *Oct 96, p. 141*

★★★/6.8 **PowerMO 2600**, Olympus Image Systems, 516/844-5000, $2199 (estimated). Reasonable price and and a two-year warranty, but middle-of-the-pack performance. *Oct 96, p. 141*

★★★/5.8 **T4-2600**, Maxoptix, 510/353-9700, $2425. No formatting software included and slow performance in its class. *Oct 96, p. 141*

## SYSTEMS

★★★★/7.0 **Genesis MP 528**, DayStar Digital, 707/967-2077, $9999. For extensive Photoshop work,

*continues*

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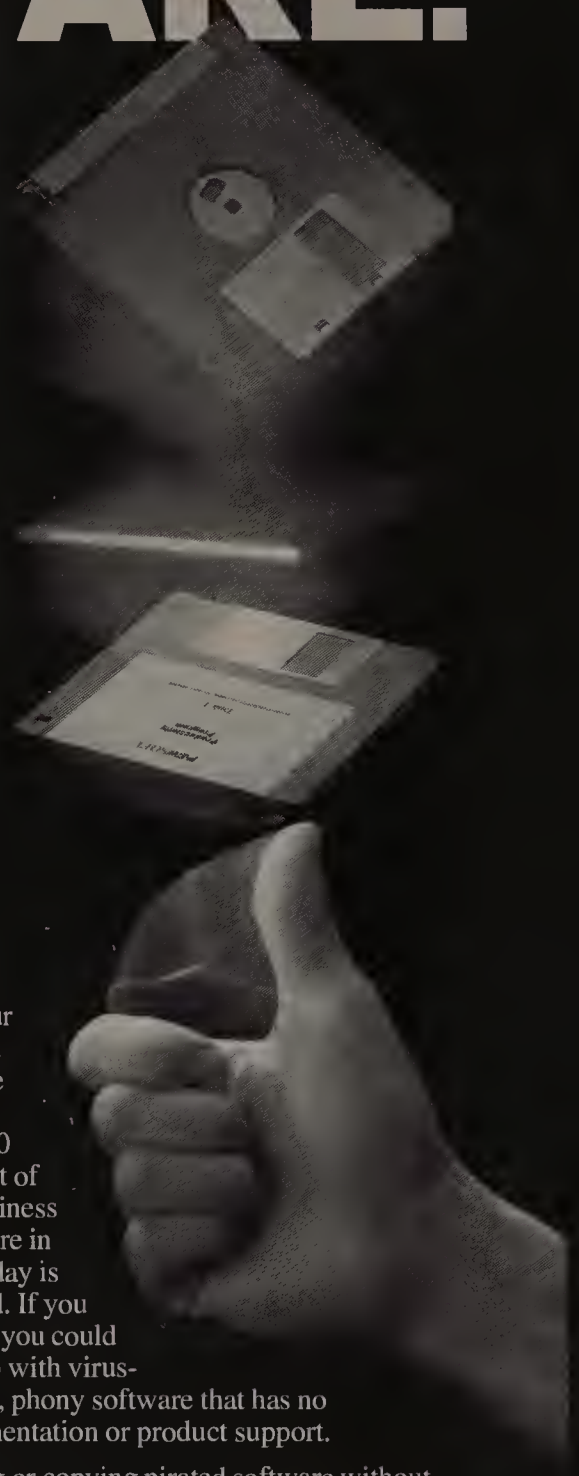

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# Star Ratings

this system may be worth its high price. *Jul 96, p. 84*

★★★★/7.2 **Genesis MP 600**, DayStar, 770/967-2077, $6999. This multiprocessing system excels at imaging tasks, but cheaper—and faster—options are right around the corner. *Oct 96, p. 58*

★★★★/7.3 **Nupowr for PowerBook 500 series**, Newer Technology, 316/943-0222, $725. Solid path to PowerPC for 500-series notebooks. *Aug 96, p. 54*

★★★/5.5 **OrangePC 440**, Orange Micro, 714/779-2772, $1396 (16 mb of RAM). Cards come on strong; SoftWindows is still slow. *Sep 96, p. 58*

★★★★/7.6 **PowerBook 500 PowerPC Upgrade**, Apple Computer, 408/996-1010, $769 with 8MB of RAM. Solid path to PowerPC for 500-series notebooks. *Aug 96, p. 54*

★★★/6.3 **PowerCenter 120**, Power Computing, 512/388-6886, $1995. The cheapest fast desktop Mac outdoes 7500/120 in price, and is near enough in speed. *Jul 96, p. 84*

★★★/5.9 **PowerCenter 120 Low Profile**, Power Computing, 512/388-6886, $1895. Low-profile case limits internal-drive expansion. *Jul 96, p. 84*

★★★★/7.1 **PowerCenter 132**, Power Computing, 512/388-6886, $1895. The desktop Mac to get if you want to shave some costs. *Jul 96, p. 84*

★★★★/7.3 **PowerCenter 150**, Power Computing, 512/388-6886, $2095. The best desktop choice—and fairly inexpensive to boot. *Jul 96, p. 84.* **Editors' Choice** for best business user's system.

★★/4.3 **Power Mac 7200/120 PC Compatible**, Apple Computer, 408/996-1010, $2799. Cards come on strong; SoftWindows is still slow. *Sep 96, p. 58*

★★/4.6 **Power Macintosh 7200/120**, Apple Computer, 408/996-1010, $2299. System is not cheap enough, and will cost too much to upgrade. *Jul 96, p. 84*

★★★/5.8 **Power Macintosh 7600/120**, Apple Computer, 408/996-1010, $2999. This flagship desktop Mac doesn't go far enough in performance. *Jul 96, p. 84*

★★★/5.8 **Power Macintosh 8500/132**, Apple Computer, 408/996-1010, $3899. For a moderate drop in performance, but a big price break, this system is still just for AV users. *Jul 96, p. 84*

★★★/6.0 **Power Macintosh 8500/150**, Apple Computer, 408/996-1010, $4699. AV professionals will continue to like the 8500, despite its hard-to-upgrade design and high price. *Jul 96, p. 84*

★★★/5.6 **Power Macintosh 9500/150**, Apple Computer, 408/996-1010, $4799. Pricey but fast; its real advantages are its six PCI slots. *Jul 96, p. 84*

★★★★/7.1 **PowerTower 166**, Power Computing, 512/388-6886, $3795. Comparable to a Power Mac 8500/150, the PowerTower 166 is cheaper but lacks AV features. *Jul 96, p. 84*

★★★★/7.3 **PowerTower 180**, Power Computing, 512/388-6868, $4195. The top Mac performer at a solid price. *Jul 96, p. 84.* **Editors' Choice** for best power user's system.

★★★★/7.6 **PowerTower Pro 180**, Power Computing, 512/388-6868, $4195. Top performance at a solid price. *Oct 96, p. 63*

★★★★/7.7 **PowerTower Pro 200**, Power Computing, 512/388-6868, $4495. Middle of the PowerTower Pro line. *Oct 96, p. 63*

★★★★/7.9 **PowerTower Pro 225**, Power Computing, 512/388-6868, $4995. Power Computing offers the fastest desktop PC ever. *Oct 96, p. 63*

★★★/6.8 **SuperMac S900L**, Umax Computer, 510/226-6886, $3995. SuperMac speeds past Apple. *Oct 96, p. 63* m

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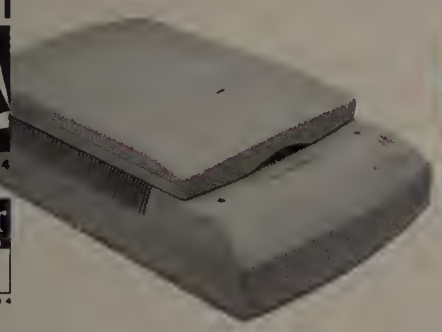

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*Cells can be easily swapped out, saving time and expense: no need to return to the factory for service. Batteries last 3-6 years under normal usage.*

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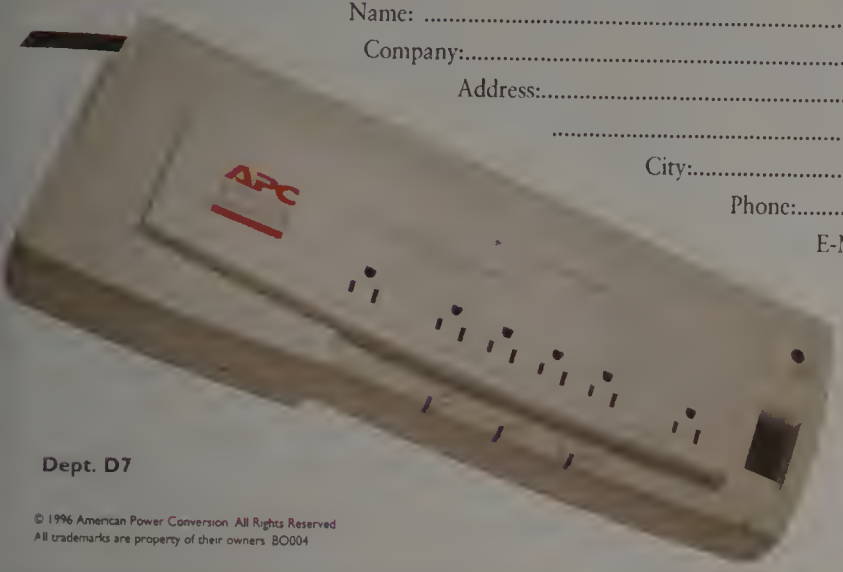


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*Back-UPS Office's built-in phone line/10 Base-T network cable surge protection prevents data surges from damaging internal and external modems, motherboards, input/output cards, and other system components.*

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Back-UPS Office provides reliable power for your entire system. Instantaneous battery backup ensures uninterrupted operation of your Mac, monitor and an external storage device. Full-time surge suppression and site-wiring fault protection spreads a true Multipath safety net under any remaining integrated peripherals, like modems, printers, faxes and phone systems. Back-UPS Office also provides convenient BlockSafe™ outlet spacing to handle all size plugs – even large block transformers.

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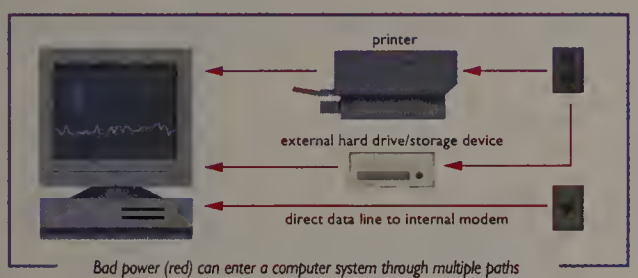
Plugging a phone line into your computer doubles your vulnerability to power problems; add any peripheral, and it triples. Even if your AC powerline is shielded, when a surge hits an unprotected peripheral, it can blaze down serial and data lines, and toast your expensive Mac.

### MULTIPATH MEANS TOTAL POWER PROTECTION




*Bad power (red) can enter a computer system through multiple paths – eg. printer, data and phone/fax lines – even if computer A/C is protected.*

*The Multipath protection of Back-UPS® Office™ shields your peripherals and guards your computer from bad power on every path, providing clean, safe power (green), to your entire system.*

Multiple peripherals and data lines to and from your system are vital, but dangerous. Without them, you can't do your job. However, if a power sag makes your modem drop the line while you're downloading from the Internet, or locks your keyboard before you've saved work, you lose time, money and spend another late night at the office to meet your deadline.

## Back-UPS Office: a safe place to plug everything

Until now, protection for your entire system required several devices. But multi-device protection can leave you vulnerable to line noise and unwanted data glitches created by the voltage differential between outlets. Those glitches are prevented with the Back-UPS Office common voltage reference.

Back-UPS Office means true Multipath protection, clean, safe power to every peripheral, and instant battery backup to keep your cutting edge system and O/S from crashing. It means protection for less by integrating the security of a surge suppressor with the power of a UPS, with protection guaranteed up to $25,000.

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| Data | | | • |
| Phone | | | • |
| **Total Outlets** | 7 | 2 | 6 |
| **Number of Block Outlets** | | | 2 |
| **Protection from** | | | |
| Surges | • | • | • |
| Spikes | • | • | • |
| Blackouts | | • | • |
| Brownouts | | • | • |
| Overvoltages | | | • |
| **Typical Runtime in Minutes** | | | |
| with Pentium 100 w/15" monitor | | 10 | 10 |
| **Battery backup for** | | | |
| PC | | • | • |
| Monitor | | • | • |
| Storage Devices/Zip Drives | | | • |
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*Traditionally, protecting all your peripherals meant having to buy a surge suppressor and a UPS. Even then, only the AC line was protected. Back-UPS Office protects all paths: Bulletproof Multipath protection.*

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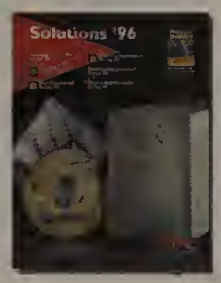


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# The Best Media Machine

Sights, sounds, and motio

**Multimedia Face-Off** In the corner at left, a 166MHz Pentium PC assembled by Macworld Lab challenges the Power Computing PowerTower 180 at right in the battle to be the best AV system, period.

by Jim Held

## Despite stiffer competition, the Mac still reigns

You're a video or audio producer and want to bring your production studio to the desktop. Or maybe you're an educator or hobbyist and want to try your hand at multimedia production. You've always heard that the Mac is the premier platform for media production, but you've also heard that Microsoft Windows is coming on strong.

You've heard correctly on both counts. The Mac remains the best platform for media producers of all levels, but Windows 95 and Windows NT machines are gaining ground rapidly. Recognizing this, developers of media-production tools are embracing Windows. Some products, such as Adobe Premiere, debuted on the Macintosh. But others are available exclusively for Windows, and the best of them will impress even the most fervent Mac zealot.

To find out how the Mac and Windows compare, Macworld Lab assembled a collection of audio- and video-production hardware and software. We didn't round up every product in every category, but instead sought out those products that are offered for both platforms or have a strong reputation in their class. With the help of Red Herring Pictures, a video- and multimedia-production house in Venice, California, we put these products through their paces: digitizing and editing video and audio, creating special effects, and analyzing the results.

Our primary goal was to compare how the Mac and Windows platforms stack up for desktop audio and video production. But we also wanted to show how some of the fastest Macs fare in a battery of audio and video tests (see the benchmark, "Media Moguls Face Off"). In particular, we wanted to see where multiprocessing has its biggest impact.

While we had our lab coats on, we added one more platform to the mix. We tested a Silicon Graphics Indigo2 Impact Max, a $48,000 workstation popular in the Hollywood special-effects industry. Price, product selection, and ease of use make the Mac and Windows platforms more appealing for most tasks and budgets, but it's enlightening to see the capabilities in the stratosphere (see the sidebar "The Impact of SGI").

Digital video and audio are demanding forms of data. They require specialized hardware for connecting external analog devices and digitizing their signals. They demand operating systems that can handle time-sensitive requirements—keeping multiple tracks of audio and video synchronized, for example. They thrive on multitasking features that speed time-consuming jobs. They need processors, memory, expansion buses, and hard drives that can move megabytes of data every second. By these measures, the Mac and Windows platforms are closer than ever; each platform holds a small edge in specific areas.

MW LAB

Architecture is important, but what makes or breaks a platform is third-party products. Here, the Windows platforms have narrowed the gap as well. (Unless otherwise noted, all references to Windows refer to both Windows 95 and Windows NT.)

## VIDEO DIGITIZING

Video digitizing converts the analog signals from a video deck into a stream of 1s and 0s. Digitizing is a game of trade-offs, where the need to compress video frames to save storage space battles with the fact that compression means compromised quality. Less expensive systems tip the scales toward compression. Midrange and high-end systems emphasize quality and thus demand high-capacity, high-performance hard drive arrays.

### How the Foundations Compare

**Hardware** Digital video requires speed: fast CPUs, fast expansion buses, and fast hard drives. All three are in equal supply in the Mac and Windows worlds.

For CPUs, the PowerPC and Pentium generally run neck and neck for media-production applications. (In 1997, Intel plans to ship an enhanced Pentium chip that incorporates its MMX technology, designed to speed certain multimedia-related operations by providing additional instructions and 64-bit processing capabilities.)

All Power Macs and most PCs include PCI expansion slots, which provide the throughput needed for video applications.

Having access to fast hardware is one thing; getting it to work is another. Windows 95's Plug and Play is supposed to ease the setup nightmares that historically plagued PCs. Plug and Play works—sort of. It simplifies setting up an individual device, but it doesn't mean multiple cards will work together.

**Apple's Contender** Before clones arrived, the highly expandable Apple Power Mac 9500 was one of the Mac's great hopes for professional digital video.

Plug and Play isn't available on Windows NT, where much of the high-end video action is. As our testing experience confirmed, hardware configuration under NT can still be a brain-bending odyssey of shuffling cards to different slots, tweaking jumpers, and fiddling with drivers.

For video and graphics work, it's useful to be able to connect multiple monitors. The Mac has the edge here, too: Windows doesn't support a multiple-monitor virtual desktop.

**System Software** Apple's QuickTime owns the digital-video world on personal computers. This domination is partly due to its availability for both the Mac and Windows.

As a technology, QuickTime is simply superior to Microsoft's Video for Windows. Basics such as performance and synchronization of audio and video are better. Also, QuickTime provides advanced features—text tracks, 3-D and virtual-reality support (via QuickDraw 3D and QuickTime VR), and built-in multiprocessing support—that Video for Windows lacks.

Microsoft is trying again, and this time it's on to something. Its ActiveMovie technology not only addresses Video for Windows' shortcomings, but also includes support for QuickTime and streaming (simultaneous downloading and playback) over distribution technologies such as satellites and the Internet. It's too early to assess ActiveMovie's impact on digital video—when we were testing, ActiveMovie for Windows was still in beta, and a Macintosh version isn't expected until late this year at the earliest. But on paper, ActiveMovie is impressive.

An operating system's ability to juggle multiple tasks can make a difference in performance—not only as measured on a stopwatch, but as perceived by users as they switch between programs and invoke time-consuming tasks. Here, Windows 95 and NT have a significant edge over the Mac OS, which is hamstrung by an aging multitasking mechanism prone to performance bottlenecks and crashes.

Windows 95 and NT feel more responsive under many circumstances. You can launch one program, then launch another while the first one loads. In many programs, you can open or save a large file and then switch to another program while the disk operation takes place. The Mac OS doesn't permit these conveniences; indeed, even a simple operation such as holding down the mouse button brings all background tasks to a halt. That doesn't happen under Windows.

Apple says Mac OS 8 will address some of these problems, but unfortunately, not until 1998 or perhaps later. The multitasking and protected-memory parts of Mac OS 8 will be introduced after the Mac OS's new microkernel, which itself almost certainly won't appear until 1998 (for more about Apple's OS strategy, see "Special Report: OS Essentials," in this issue).

The Mac may be weak at multitasking, but it's no slouch at multiprocessing, thanks to the MP architecture developed by DayStar Digital and Apple and used in DayStar's Genesis MP family and its nPower 360+ card (which also powers Apple's Power Macintosh 9500/180MP and runs on Power Computing and Umax clones as well). When used with applications that support multiple processors, these machines scream through complex tasks such as rendering and filtering.

With QuickTime 2.5's multiprocessing support, any application that performs video compression will get a major speed boost. In informal tests conducted with QuickTime 2.5, Cinepak compression with the Genesis MP was nearly twice as fast as with an equivalent single-processor Mac.

**Who Wins** Macintosh, thanks to the power and maturity of QuickTime, the Mac OS's superior plug-and-play features, and the Mac's ability to drive multiple monitors.

### How Video Hardware Compares

**Out-of-the-Box Video** Apple's Power Mac 8500 provides built-in video-digitizing and video-output features (see *Media*, in this issue). Add a fast hard drive, and you can digitize quarter-screen video at 30 frames per second. With the 8500's hardware-zooming functions, you can connect an NTSC monitor or video recorder and play those movies back at full-screen sizes.

There's a vast selection of third-party digital-video products for Windows computers, but no mainstream Windows

machine includes ready-to-use video-digitizing and video-output features. In a way, this isn't surprising: the PC mind-set stresses building your own system customized to your needs rather than buying a turnkey one.

**Who Wins** Macintosh. The Windows world has no equivalent to the out-of-the-box capability of the 8500.

**Entry-Level Digitizing** As quality requirements increase, Windows machines become contenders.

The entry point for full-screen, full-motion PCI-based digitizing cards is about $1000. The best-known member of this spectrum is miro's (415/855-0940, *http://www.miro.com*) $799 miroMotion DC-20, which provides S-Video–quality digitizing and playback. The DC-20 works on PCI machines. We tested the DC-20 under the Mac OS and under Windows 95. It worked well on both platforms, although under Video for Windows the sound sync drifted over time. (Loss of audio-video sync is a common problem in Video for Windows; it has plagued QuickTime to a lesser extent over the years, although QuickTime 2.5 addresses it nicely.) We also encountered some dropped frames on a Power Computing PowerTower 180, but paring down our extension collection fixed the problem.

A similar card is Truevision's (408/562-4200, *http://www.truevision.com*) $1095 Bravado 1000, in Mac or Windows 95 (not NT) versions; both include Adobe Premiere 4.2.

**Who Wins** Macintosh. The third-party hardware is generally equivalent across platforms, but QuickTime maintains sound-video synchronization better than Video for Windows.

**The Middle Digitizing Ground** The $3000-to-$5000 range is occupied by a new generation of products that outperform NuBus-based digital-video products, providing superior video quality and faster performance for less money.

The $3295 Truevision Targa 1000, a PCI card available for the Macintosh and for Windows NT (not 95), provides full-screen video digitizing and CD-quality audio recording and playback. We tested the $3995 Truevision Targa 1000 Pro, which adds support for Betacam component video and true CCIR-601 component digital video.

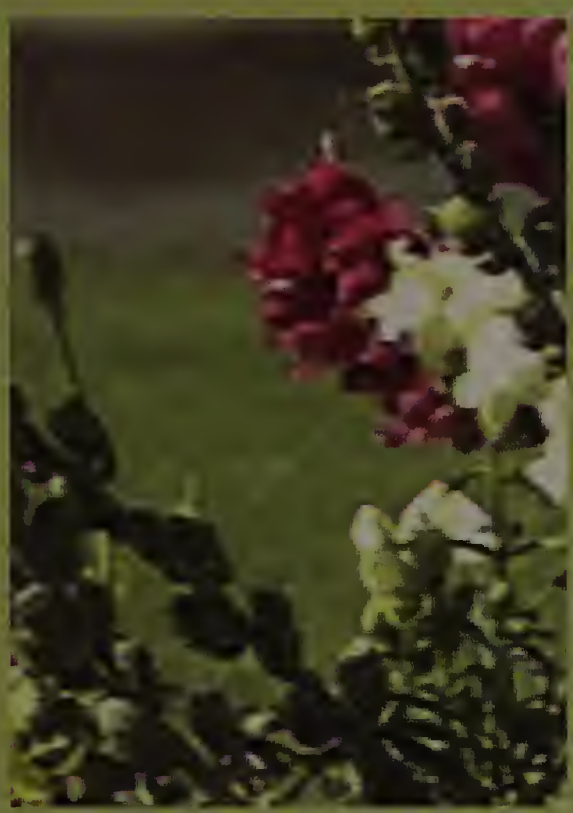
We also tested Media 100's (508/460-1600, *http://www.media100.com*) Mac-only $4995 Media 100qx. The Media 100qx combines digital video and CD-quality stereo audio digitizing in one PCI card; a $2000 option adds component video support. In a nutshell, colors captured by the Targa card seemed truer, while the Media 100qx's colors were a bit flat.

Because these products use lower video-compression ratios in order to provide better image quality, they demand high-speed disk arrays and high-performance SCSI controller cards. We used a 16GB, PCI-based FWB (415/833-4616, *http://www.fwb.com*) SledgeHammer Pro disk array for both the Mac and Windows platforms. We experienced much more difficulty tweaking drivers and optimizing the array's performance under

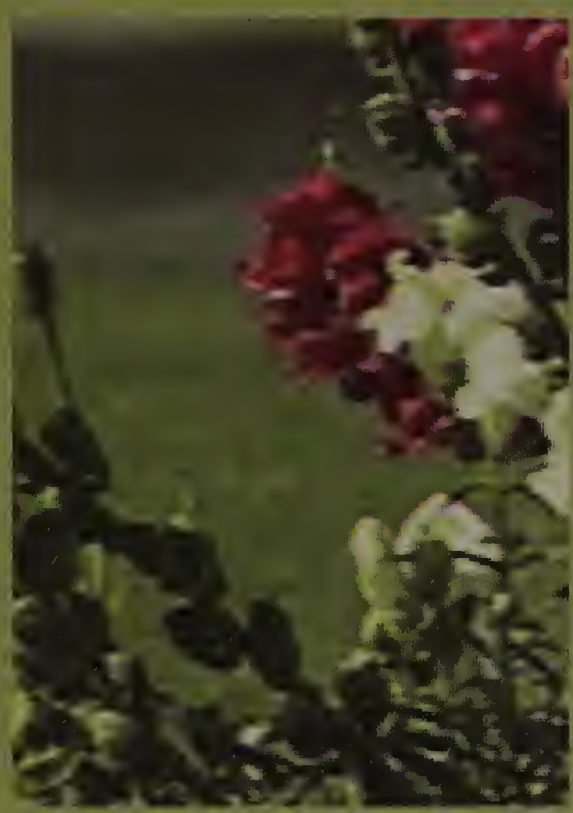
## Freeze Frames: Comparing Digital-Video Quality

The complexities of video digitization and compression mean that no two cards deliver identical results. Here are single-frame captures from three of the cards we tested. The original video is from a Sony Betacam.

**miroMotion DC-20 (Mac and Windows)** This card provides full-screen, full-motion video for $799. But next to the output of costlier cards, its quality limitations are apparent. Image contrast is flatter, colors are less saturated, and compression artifacts are visible in the areas of sharp contrast, such as where the flower stems meet the green background.



**Truevision Targa 1000 Pro (Mac and Windows)** This $3995 card delivers excellent image quality, with rich contrast and color saturation and minimal artifacts. This image was captured using Truevision's codec. When we tested the card with Avid's MCXpress software, which uses an Avid codec, we saw more compression artifacts and poorer edge details.



**Media 100 (Mac Only)** The $22,900 Media 100 system provides outstanding image quality. The card retains shadow details a bit better than the Targa 1000: note the flower stems in the shadowed area in the lower-left corner of the image. Compression artifacts are minimal.

# The Impact of SGI

Personal computer manufacturers frequently introduce their fastest machines by saying they provide "workstation-like" performance. The workstations they refer to are often those made by Silicon Graphics, Inc. (415/960-1980, *http://www.sgi.com*). SGI machines have a well-deserved reputation for performance and have attracted numerous developers of high-end 3-D–modeling and –rendering packages and video-effects tools. This has made them popular in the rarefied world of motion-picture and broadcast-graphics production. (Many SGI models have also become the tools of choice for scientific and industrial applications and for high-end Web-site development and content serving.)

We tested an SGI Indigo2 Impact Max, in which a 250MHz MIPS R4400 (a 64-bit RISC processor) presides over 128MB of high-speed memory (expandable to 384MB), an array of custom graphics acceleration chips, three EISA expansion slots, digital and analog audio-input and -output connectors, and two Fast SCSI-2 buses. For supplemental storage, we used a disk array from Ciprico (612/551-4000, *http://www.ciprico.com*). The computer runs IRIX, SGI's version of the Unix operating system, on top of which runs a downright gorgeous graphical user interface. The interface doesn't fully mask the complexities of Unix, however, which is a bear to set up, maintain, and optimize. By the same token, though, its speed, low-level system control, and multitasking capabilities are well ahead of those in the Mac OS or Windows 95 or NT.

**Road Tests** Spend a few minutes with a system like this, and you'll never again look at a Mac or Windows machine in the same way. No Mac or Windows machine can deliver the kind of real-time, photo-realistic 3-D graphics that we saw on the Indigo2's *screen saver*.

**HOT BOX, INSIDE AND OUT** An SGI Indigo2 is justifiably popular as a multimedia-production workhorse.

After recovering from the Indigo2's screen saver and other graphics demos, we tested several key compositing, effects, and postproduction programs, including Discreet Logic's Flint (prices, including an SGI system, start at $100,000; 514/272-0525, *http://www.discreet.com*), Xaos Tools' Pandemonium ($4495; 415/487-7000, *http://www.xaostools.com*), Interactive Effects' Piranha Animator ($10,000; 714/551-1448, *http://www.webcom.com/~ie*), and Alias|Wavefront's Composer ($7995; 416/362-9181, *http://www.aw.sgi.com*).

At a basic level, these programs provide the kind of video-compositing features that you find in Adobe After Effects. However, they often provide far more image and motion control than After Effects does, and they typically take advantage of the SGI's 3-D talents in a variety of ways, enabling you to paint on and apply video and images to 3-D objects, and apply 3-D lighting and effects to 2-D images. We were particularly impressed with Flint's elegant design and ability to work with uncompressed video in near real-time.

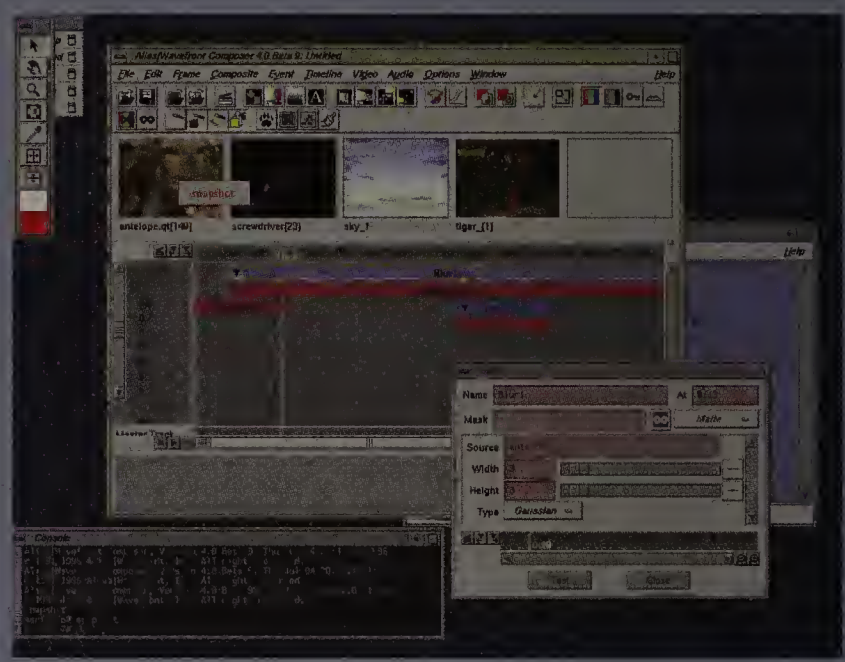
In the SGI world, the definition of rendering quality tends to differ from what we Macintosh users are accustomed to. With Flint, for example, draft-mode rendering is often equivalent to what Mac or Windows products deliver at their highest-quality settings. And while we rave about 32-bit color support, these programs often support 48 and 64 bits.

However, because Unix is complex and because these programs tend to take over the system at a low level and are difficult to set up, most workstation users run only one or two programs on their systems—there isn't the application mixing and matching that personal computer users take for granted. This is one reason why most programs take an all-in-one approach to their feature sets.

**Good for Each Other** The capabilities of Indigo2-class workstations and software are an order of magnitude beyond those of the best Mac and Windows systems, but price and complexity make them impractical for most media producers.

For high-end shops, it isn't an either-or proposition: many have supplemented their workstations with Macs and PCs, which handle less demanding tasks and free up time on their big boxes. Apple and SGI are cooperating to add features to QuickTime that enable exactly this kind of collaboration.

Finally, workstations are helping to create the state of the art: they drive personal computer manufacturers to improve the capabilities of their fastest systems, and they inspire software developers to add features traditionally available to a select few. Every kid needs someone to look up to; workstations give Macs and PCs that someone.

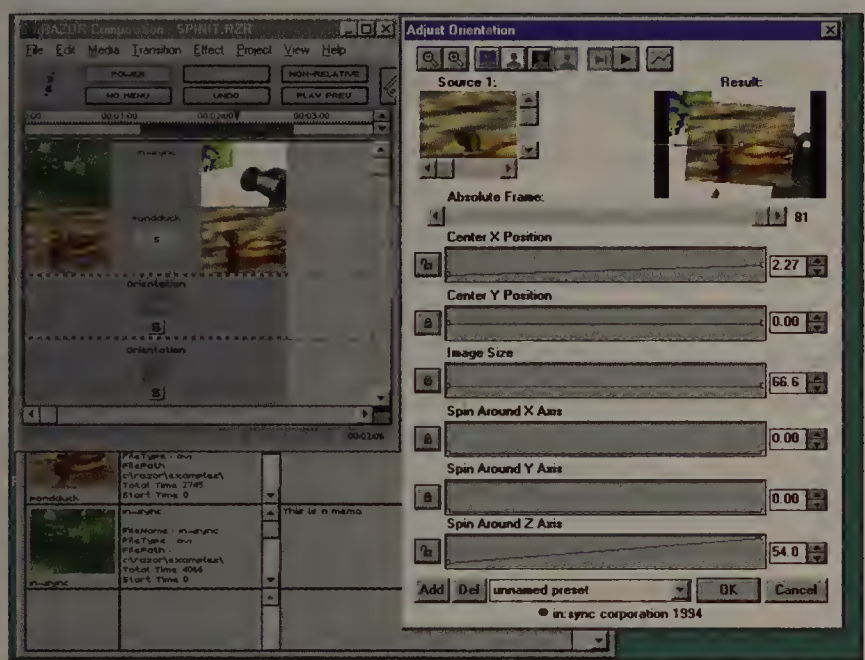


**AV AT THE SUMMIT** Alias/Wavefront's Composer is one example of SGI video-compositing and -effects software with a graphical interface that will appear familiar to any Mac or Windows veteran. You can also type commands into the IRIX Console window (at the bottom of the screen)—extra control that Mac and Windows programs don't provide.

Windows NT than under the Macintosh Operating System.

**Who Wins** Macintosh, thanks to its superior plug-and-play features. It's simply easier to set up and optimize a digitizing card and high-performance storage system under the Mac OS than under Windows. However, once you successfully set up a Windows system, the overall quality of its output is just as good.

**High-End Digitizing** We tested Truevision's $10,995 Targa 2000 RTX and Media 100's ($10,995) Media 100. (Actually, we tested the $22,900 Media 100 Plus Whole Deal configuration, which includes a battery of options such as additional accelerated effects, a full eight tracks of audio, and a character generator for on-screen titles.) The Targa 2000 series is available for Windows NT and the Mac; the Media 100 family is Mac only.



**Razor Sharp** in:sync's Razor Pro (left) and Speed Razor Mach III combine Premiere-like video-editing features with motion control and effects similar to those of Adobe After Effects (right). But the Razor family's effects capabilities can't keep up with those of After Effects, a Mac-only application—at least until early next year, when Windows versions ship.

Both products are major-league systems for video and broadcast professionals. Both can control external video decks; support component video; provide hardware-accelerated effects; and supply the low compression and high data rates necessary for tack-sharp video.

The Targa 2000 RTX has a unique dual video-stream architecture that lets it create, in real time, common video effects such as dissolves, wipes, pushes, and video within video. With compression ratios of less than 2:1, the Targa 2000 RTX had the edge in image quality; we were hard-pressed to find any compression artifacts, even after magnifying captured frames.

The Media 100 includes its own editing software, which is easy to use and provides solid media-management features—better than those of Adobe Premiere, though not as complete as those of Avid's MCXpress. The Truevision Targa 2000 RTX relies on third-party applications.

Scitex Digital Video's (415/369-5111, *http://www.scitexdv.com*) $13,500 MicroSphere combines the Targa 2000 RTX with Scitex's Sphere video-editing software, which runs on the Mac.

**Who Wins** The Targa 2000 series has enabled Windows to draw close to the Mac. However, the Media 100 is a superb product that's available only for the Mac. Also, the disk arrays that are so essential to high-end video products are easier to set up and optimize on the Macintosh. The Macintosh still has the edge.

## How Video Software Compares

**Video Editing** After getting video into digital form, you must edit raw footage into a finished product—trimming clips, creating cuts and transitions between them, and generating a final movie. For video editing, the venerable Adobe Premiere 4.2 ($795; 415/961-4400, *http://www.adobe.com*) comes in Mac and Windows versions; the Windows version works with both Video for Windows and QuickTime files (see *Reviews*, March 1996).

Premiere's Windows performance is on par with its Mac counterpart's, and Adobe has nicely exploited Windows' two-button mouse, adding context-sensitive shortcut menus that appear when you right-click on a window or object. The Mac version also has shortcut menus, but to display them you must press ⌘-option-control while clicking.

Premiere dominates among Mac video editors, but it has competition in the Windows world. Ulead Systems' (310/523-9393, *http://www.ulead.com*) $349 Media Studio Pro (for Windows 95 and NT) includes video, audio, and image editors as well as a morphing program, a screen-capture utility, a media database, and a batch-file-conversion utility. The video editor is particularly strong, offering a wider range of compositing, motion-control, and special-effects options than Premiere. Most of the other programs lack the power of stand-alone equivalents, but together they form a powerful whole. I wish a package this versatile were available for the Mac.

in:sync's (301/320-0220, *http://www.in-sync.com*) $799 Razor Pro (for Windows 95) is another formidable contender, providing Premiere-like editing features with a more versatile approach to video and audio tracks that suits it better to projects requiring complex compositing and layering. For Windows NT, in:sync offers the $1499 Speed Razor Mach III, which provides faster performance, additional effects, and higher rendering quality. We were impressed with Speed Razor Mach III, but found it very finicky about hardware configuration.

We also tested Avid's (508/640-6789, *http://www.avid.com*) $4995 MCXpress for Windows NT. This industrial-strength video-editing package works with Truevision's Targa digitizing cards. (It's also sold with these cards starting at $15,000; the software and the bundles are available for PCI Macs.) MCXpress provides features and an interface similar to that of Avid's top-

of-the-line Media Composer family, which runs on PCI Power Macs, priced from roughly $20,000 to $120,000.

The MCXpress software's compatibility with Media Composer systems makes it appealing to Media Composer owners who want to add lower-cost editing workstations. However, we endured numerous configuration dramas before the program ran reliably under Windows NT. What's more, we noticed that video captured using Avid's video compressor/decompressor (codec) and a Targa 1000 card lacked the quality of video captured using the same card with Truevision's own capture utility. Black areas were more prone to artifacts, and background edge details weren't as clear.

**Who Wins** Windows, but with qualifications. The selection of Windows-based editors is larger than that of Mac packages, and Windows-based editors often feel more responsive, thanks to Windows 95's and NT's superior multitasking. But an editor is useless without video digitizing and fast storage hardware, and integrating these components is easier on the Mac.

**Video Compositing and Effects** You might want to create special effects by layering multiple tracks of video, animating video clips, and applying appearance-altering filters. The industry standard for video compositing on personal computers is Adobe After Effects ($995; production bundle $1995; see *Reviews*, March 1996). After Effects has long been a Mac-only product, but Windows 95 and NT versions are scheduled to ship early next year. When After Effects becomes available for the Windows platforms, the Mac will lose a key advantage.

Many video-effects packages are plug-ins that tap into programs such as After Effects and Premiere. One of the finest collections, MetaTools' KPT Final Effects ($695; 805/566-6200, *http://www.metatools.com*), works with After Effects and thus is currently a Mac-only product (see *Reviews*, April 1996). KPT Final Effects' junior cousin, Final Effects AP ($249), works with Adobe Premiere (Mac and Windows versions). Most other filter and transition collections are offered for both platforms.

**Who Wins** Macintosh, but only until MetaTools ships a Windows version of After Effects.

## AUDIO PRODUCTION

Audio production has several facets: creating monophonic or stereophonic recordings; editing recordings to remove flubbed words or add background music; editing soundtracks for digital-video productions; and creating multitrack recordings.

### How the Foundations Compare

**Hardware** Every Mac includes built-in audio recording and playback circuitry; all Power Macs can record and play 44kHz, 16-bit stereo audio without additional hardware.

Few Windows computers include on-board audio circuitry; however, the vast majority include a third-party sound card—often one of Creative Labs' SoundBlasters. A high-quality sound card typically sells for about $200 and provides stereo audio-input and -output jacks and digitizing circuitry that supports 44kHz, 16-bit recording and playback.

Windows sound cards generally provide features no stock Mac provides, including MIDI (Musical Instrument Digital Interface) connectors and on-board MIDI synthesizers. PC games often take advantage of sound cards' synthesis features, which also work well with Web-browser MIDI plug-ins (including Apple's QuickTime plug-in for Netscape Navigator 3.0).

There are no MIDI synthesis cards for Macs. Apple has built excellent MIDI support into QuickTime, but midrange and high-end Windows sound cards provide better sound quality. Also, unlike QuickTime, MIDI-equipped Windows sound cards include sounds for all 128 General MIDI instruments.

**System Software Support** In the Mac OS, the Sound Manager handles sound recording and playback. The Sound Man-

## What Will It Cost?

The huge array of computer systems, peripherals, and software makes it impossible to provide specific prices for a media-production system. But here are ballpark price ranges for the hardware and software you'd need to add to a Power Mac.

We recommend a PCI-based machine with a PowerPC 604 chip, at least 32MB of memory, 24-bit video, and a 17-inch or larger display. (One such system, a 200MHz Power Computing PowerTower 200e, costs $5075. it's worth noting that a similarly equipped Pentium-based PC—a 200MHz Dell Dimension XPS-200—costs only $3617, plus about $300 for a SCSI controller card.) For midrange and high-end products, we recommend a Mac model that has been certified by the vendor of the video-digitizing hardware you're considering.

### LOW-BUDGET VIDEO

Here are tools for amateur production, in-house corporate, or educational video.

**Digitizing Hardware** miro miroMotion DC-20; includes Adobe Premiere LE (limited feature set). $799.

**Supplemental Storage** 4GB hard drive. Approximately $1000.

**NTSC Monitor** Optional—allows you to preview video as it will appear on a TV. Approximately $300.

**Software** Adobe Premiere. Estimated price $500.

**Total** Approximately $2600.

### MIDRANGE VIDEO

These tools are for high-quality corporate or educational video and low-end broadcast use.

**Digitizing Hardware** Media 100's Media 100qx or Truevision Targa 1000. $3000 to $5000, depending on options.

**Supplemental Storage** Disk array. $3000 and up, depending on speed and capacity.

**NTSC Monitor** Approximately $500.

**Software** Adobe Premiere. Estimated price $500.

**Total** Approximately $8000.

### HIGH-END VIDEO

For well-heeled corporate users and broadcast use.

**Digitizing Hardware** Media 100, $10,000 and up, or Truevision Targa 2000 family. $8000 and up.

**Supplemental Storage** Disk array. $3000 and up, depending on speed and capacity.

**NTSC Monitor** Approximately $500.

**Software** Included with Media 100. For Truevision products, Adobe Premiere, estimated price $500.

**Total** Approximately $14,000 and up—way up.

### SUPPLEMENTAL SOFTWARE

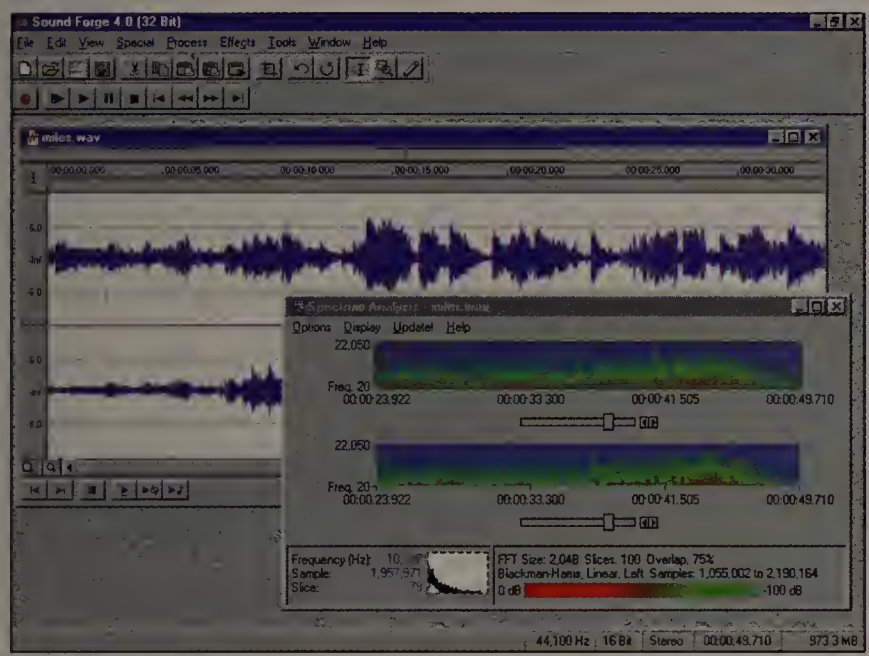
**Adobe After Effects** Special effects and compositing software. Estimated price $700 ($1900 for production bundle).

**MetaTools KPT Final Effects** Effects plug-ins for After Effects. $695.

**MetaTools Final Effects AP** Effects plug-ins for Adobe Premiere. $249.

**Macromedia SoundEdit 16 and Deck II** Software-only audio editing and multitrack recording. Estimated price $389.

**Waves AudioTrack** Premiere and Deck II audio-enhancement plug-in module. Estimated price $249.



**Audio Forges Ahead** Although Intel-based machines lack built-in audio circuitry, Windows is a formidable platform for audio production, with inexpensive yet powerful sound cards and outstanding software such as Sonic Foundry's Sound Forge (left), a waveform and sample editor. Data Translation's Media 100 (right), a popular Mac-only high-end system, provides eight tracks of CD-quality digital audio, a well-designed editing program, and an expandable hardware architecture that supports effects acceleration.

ager provides a solid list of features, including the ability to record while playing back previously captured sound—essential for multitrack recording applications. Alas, the Sound Manager often has problems playing back multiple tracks in perfect synch.

Still, the Sound Manager is well ahead of its Windows 95 equivalent, which doesn't even allow simultaneous recording and playback. (Windows-based multitrack audio products such as Digidesign's Audiomedia III bypass the Windows sound manager.) Microsoft is promoting its DirectSound technology as a next-generation foundation for audio, but it initially doesn't support simultaneous playback and recording, either.

**Who Wins** Macintosh, but with qualifications. Sound cards are so common in the Windows world that a Mac's built-in audio no longer represents a significant strength for amateur and semiprofessional two-track audio applications—especially since those ubiquitous Windows sound cards often provide superior features. The Mac OS's Sound Manager is better equipped for multitrack audio applications, but Apple needs to fix the synchronization problems.

## How Audio Products Compare

**Audio Editing and Processing** Macromedia's SoundEdit 16 ($389; 415/252-2000, *http://www.macromedia.com*) incorporates support for QuickTime soundtracks, CD-quality audio, and plug-in sound-processing modules (see *Reviews*, June 1996). At the high end, Digidesign's venerable Sound Designer II ($495; 415/842-7900, *http://www.digidesign.com*) meets the needs of audio professionals and is the foundation for powerful audio plug-ins from third-party developers (see "The Mac Recording Studio," December 1995).

On the Windows side, we tested two professional-level audio editors: Sonic Foundry's Sound Forge ($495; 608/256-3133, *http://www.sfoundry.com*) and Steinberg's WaveLab ($399; 818/993-4091, *http://www.steinberg-us.com*). Both of these powerful, easy-to-use programs take advantage of Windows' multitasking and multithreading features to deliver faster, smoother performance than any Mac audio editor can. For example, they enable you to switch to other applications while a lengthy audio file loads from disk. Wavelab can even perform many processing functions while playing back.

**Who Wins** Windows, with qualifications. Editing QuickTime movie soundtracks is easier on the Mac because SoundEdit 16 can open QuickTime movies directly. Still, the power of Sound Forge and WaveLab creates an argument for exporting soundtracks to audio files, editing them under Windows, and then reuniting them with their movies. Also, if your audio-processing needs demand a plug-in that isn't offered for Sound Forge, the Mac is preferable.

**Multitrack Recording and Playback** For software-only multitrack audio, the Mac's dominance resonates. Built-in audio-digitizing circuitry and connectors make Macs perfect for amateur and semiprofessional audio work. A fast hard drive or disk array enables PowerPC 604–based Macs to record and play back a dozen or more tracks. There are no software-only multitrack programs for Windows.

Midrange hardware sings a different tune. Digidesign's Audiomedia III ($995), a PCI card, provides CD-quality multitrack recording for Windows machines or PCI Macs. Testing the Audiomedia III on a 166MHz Pentium computer running Windows 95 was a plug-and-play, hassle-free experience. The card worked beautifully with Sound Forge and WaveLab and delivered outstanding results with Digidesign's Session multitrack software. The Session/Audiomedia III duo can handle four simultaneous recording tracks and eight tracks of playback.

At the high end, the Mac holds a strong audio advantage—for now. Digidesign's ProTools III ($6995 and up), available for NuBus- and PCI-based Macs, provides professional-quality digital-signal processing and a groundbreaking plug-in architecture that has made it the most popular high-end audio product.

Numerous third-party developers, including pro-audio firms such as Dolby and dbx, have shipped an array of sound-processing plug-ins that work under ProTools. ProTools also accepts add-ons that unite it with digital-video systems, enabling you to create and edit video soundtracks and then synchronize them with the original video.

With the ProTools hardware in PCI form, it's only a matter of time before Digidesign creates Windows software for it.

**Who Wins** For software-only audio, high-end multitrack

## Media Moguls Face Off

For media producers, performance is paramount. Rendering video transitions and special effects, compressing video, and processing audio are time- and processor-intensive jobs.

To see how Mac and Windows platforms compare, we conducted performance tests on a 166MHz Pentium computer running either Windows 95 or Windows NT, a DayStar Digital Genesis MP 600, an Apple Power Mac 9500/150, and a Power Computing PowerTower 180. Since we finished testing, faster models have shipped—though they are in short supply (see "Systems Watch," *News*, in this issue). But the following results are readily scalable to the faster machines and their successors—and will be until the companies adopt new system architectures sometime this spring.

Key findings include:

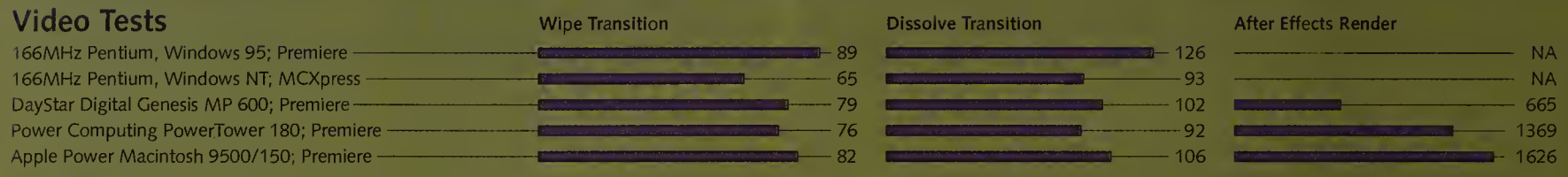
• Single-processor Mac and Pentium machines perform equally well in media-production tasks. Each platform has small performance advantages, but not the kind that should sway a buying decision. When we ran video tests under Windows NT, the Pentium machine showed a bigger performance advantage—evidence that the PowerPC chip is hamstrung by the Mac OS's aging multitasking architecture and lingering emulation of 680X0 code.

• If you run Mac applications that are not multiprocessor-aware, processor speed is everything. With such applications, the 180MHz PowerTower 180 was faster in every test than the four-processor DayStar Genesis MP 600.

• If you run Mac applications that are multiprocessor-aware, a multiprocessor machine is a must. Adobe After Effects was more than twice as fast on a Genesis MP 600 than on the PowerTower 180, and almost three times as fast as the Power Mac 9500/150. Many mainstays of media production, from Adobe Photoshop to Strata Studio Pro, are also multiprocessor aware. And now that QuickTime is multiprocessor-aware, any program that compresses or plays video enjoys a significant improvement.

Shorter bars are better. Times are in seconds.

### Video Tests




### Audio Tests

### Behind Our Tests

We ran a variety of tests that represent common time-consuming media-production tasks—examples of which are shown here. For video, we timed how long it took to render two common transitions: a two-second wipe and a two-second cross-dissolve. The project resolution was 640-by-480, 24-bit color, using the codec specified by each board vendor. With the Mac OS and Windows 95, we used Adobe Premiere 4.2 (45MB of memory allocation); on Windows NT, we used Avid's MCXpress 1.0 (32MB of memory allocation). On the Mac OS machines only, we also measured the time required to render an Adobe After Effects 3.1 (70MB of memory allocation) project containing eight layers and numerous filters and effects. For audio, we measured the time required to resample a four-minute, 44kHz and 16-bit recording to 22kHz and 8 bits, and the time required to apply a reverb effect to the same clip. On the Mac OS, we used Macromedia's SoundEdit 16 2.0; under Windows 95, we used Sonic Foundry's Sound Forge 3.0 (32MB of memory allocation). The 166MHz Pentium machine had 64MB of memory and ran a 512K cache. The Macs had at least 80MB of RAM and ran System 7.5.3. We used a 16GB, PCI-based FWB SledgeHammer Pro disk array.—**Macworld Lab testing supervised by Avi Hoffer, Red Herring Pictures**

audio, and soundtrack postproduction, the Mac rules, although Windows is improving steadily at the high end. For midrange multitrack audio, it's a tie: the Digidesign Audiomedia III card has leveled the field.

### The Last Word

From its system architecture to its third-party product selection, from its ease of integration to its ease of use, the Macintosh remains the best personal computer for media production.

Although Windows 95 and Windows NT have closed the gap significantly, each still has drawbacks. Windows 95 has a greatly improved user interface and plug-and-play features but an awkward file-management scheme. Windows NT provides a more robust file system and dreamy multitasking features, but lacks plug-and-play capabilities and is difficult to optimize. While the Windows world makes you choose between ease of use and power, the Mac combines a generous dose of both.

The Mac OS machines we tested illustrate a trend that bodes well for the Macintosh platform: it's the clone manufacturers who are pushing the performance envelope.

DayStar Digital's MP architecture, also adopted by Apple, delivers great performance with Adobe After Effects and Photoshop, and with QuickTime 2.5.

Power Computing has shown itself willing and able to take advantage of the latest, fastest PowerPC chips. When we began testing for this story, the PowerTower 180 was the fastest Mac OS machine available; within weeks, it was eclipsed by PowerTower Pro models running at up to 225MHz.

Power Computing also offers its own AV machines configured with the outstanding miroMotion DC-20 card—which, unlike Apple's Power Mac 8500, provides full-motion, full-screen video. As the clone market grows, the competition should keep performance up and prices down.

However, because high-end audio and video products demand so much from a computer, their makers tend to support only specific computer models that have passed certification tests. At this writing, Digidesign, Data Translation, and Truevision guarantee compatibility with Apple-brand PCI Macs only. (Truevision has also certified the DayStar Genesis MP.)

This kind of problem plagues the PC world and is likely to become more common in the Macintosh world as the clone industry grows. But it's preferable to a large-scale user and developer defection to Windows. A market filled with a diverse array of fast, competitively priced machines is exactly what's needed to keep the Macintosh the best machine for making media. **m**

Contributing editor and *Media* columnist JIM HEID operates a Web site (*http://www.heidsite.com/*) that covers Mac-based media production.

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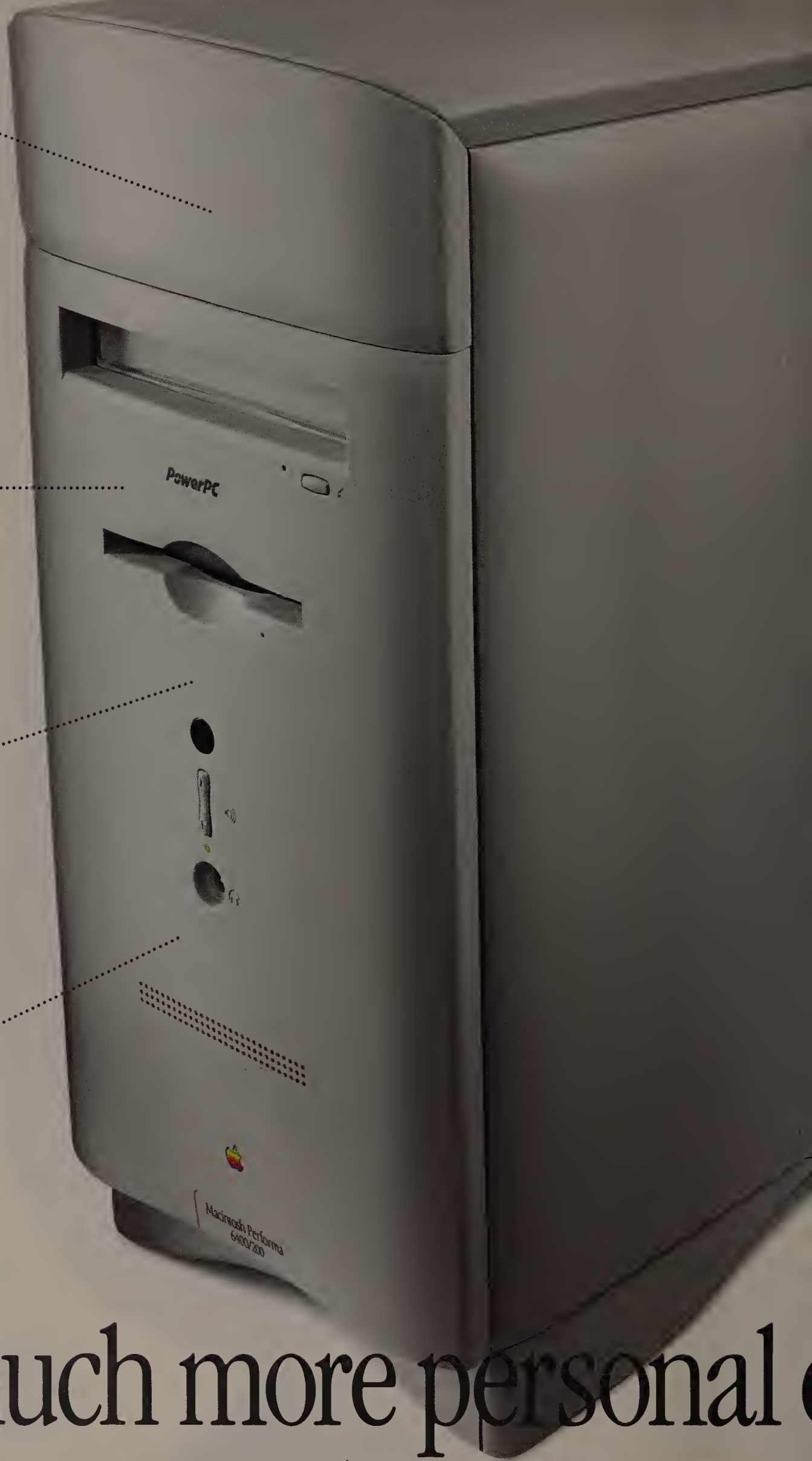


# How much more personal

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It also brings the Internet home with a 28.8 Kbps modem and all the software you need not only to get up and surfing on the Net,* but to easily create your own web page as well.

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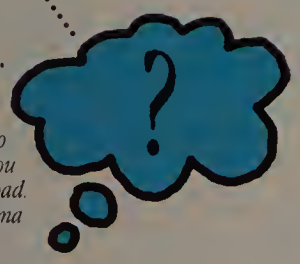

# un a personal computer get?

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# Your Mac Is Ringing

Macs and telephones merge, but does the software connect?

by Howard Baldwin

Quick show of hands: how many of you have ever answered the phone only to find the call was already on its way to voice mail? And how many of you wanted to just push a button and yank the call back? Almost everyone? I'm not surprised. Though it's the most convenient, widespread communications device known to mankind, the telephone has a lousy interface: 12 buttons, no drop-down menus or intuitive icons, and no backspace key.

Meanwhile, undoubtedly not far from your office phone sits your Macintosh, a device known for its ease-of-use interface. But the Mac isn't exactly the first piece of equipment that comes to mind when you think of voice mail or making outgoing calls. That could change, thanks to a technology called computer-telephone integration (CTI) that strives to merge the telephone with the personal computer.

Imagine Mac software, complete with a 12-button telephone keypad interface, that lets you erase an incorrectly entered digit before you place a phone call, saving you from having to redial the whole number, or worse, being charged for a misdialed long-distance call. Visualize being able to access faxes and voice-mail messages from one mailbox on your Mac. And

imagine having the ability to set up an office voice-mail system on your computer without investing in costly, proprietary voice-messaging hardware and software.

Despite these attractive features, Mac telephony is not yet a mature technology. Some programs, for instance, just don't deliver the simplicity and ease of use for which the Mac is famous. To help you find the best, most reliable programs, I let my fingers do the walking through seven currently shipping Mac telephony applications. (Two programs, Sagem's [*http://www.satusa.com*] The Phone and Third Planet Publishing's [*http://www.3rdplanet.com*] DigiPhone for Mac, weren't available for review in time for this article.)

In essence, there are three types of Mac telephony products. The first type, including Big Island Communications' YoYo and Cypress Research's MegaPhone, are designed for single users. These programs offer diverse features.

**Cyberspace Calling** VocalTec's Internet Phone interface features an animated figure that talks, listens, or sleeps, depending on the status of your phone connection. You also get information on who's calling, the speed of your transmission, and more.

Some primarily do call management, while others throw in voice mail and faxing—which makes life difficult for comparison shoppers. In this article, I've focused mostly on the single-user products, as they're the easiest to set up and use and are often the most versatile programs of the lot.

The second group, multiuser telephony products, which includes Cypress Research's Voice Messenger and Pacific Image Communications' SuperVoice, offer voice-mail messaging and other features. They're considerably more difficult to install and use and are mostly geared for small to medium offices. Moving up the scale in complexity, the third group consists of call-management products for corporations. They're covered in the sidebar, "Top-Gun Telephony."

## Single-User Telephony: Call Management

Call-management software, the most prevalent type of single-user Mac telephony software, represents the basics behind merging the phone and the Mac. For starters, it uses a representation of a telephone keypad for an interface. To make a call, you click on the numbers in the keypad or select a person's name from an address book of preentered numbers. The Mac does the rest, keeping a record of whom you called, when, and how long you talked.

But that's where the similarities end. The three products that focus primarily on call management—Big Island Communications' (*http://www.big-island.com*) YoYo, Cypress Research's (*http://www.cypressr.com*) MegaPhone, and Diamond Multimedia's (*http://www.supra.com*) SupraSonic VoiceMail—all take different approaches to transforming your Mac and telephone into an intelligent communications system.

**Hardware Required** You need a piece of hardware to act as an intermediary between your Mac and your phone. Of the call-management products, the Big Island YoYo hardware is the most unusual. The YoYo is designed to integrate with, and expand the capabilities of, Caller ID (a service available now from most telephone companies that displays the phone number of an incoming call). The package includes a telecommunications device that uses a 1200-bps modem chip to route calls from your phone line to your Mac. About the size of a bagel, the

**Red Light, Green Light** If you're not at your desk when you receive a call, a light on the front panel of Big Island Communications' YoYo turns from red to green. Software that comes with a bagel-shaped device reveals who's calling.

DAVID GAZ

device has an ADB pass-through jack that plugs into the back of your Mac. A green light showing through a curved piece of plastic on the front of the device turns red when a call comes in.

In contrast, Cypress Research's MegaPhone requires a modem to interface with your telephone. The modem isn't included, and you're limited to using specific, albeit commonly used, models (see the table, "Calling All Macs.") Diamond Multimedia's SupraSonic VoiceMail ups the ante, as it ships with the company's own 33.6V+ fax modem.

**Call Handling** Of the three programs, YoYo and MegaPhone offer the most attractive call-handling features. Even so, they have their differences. YoYo is particularly adept at providing instant, detailed information on who's calling. In conjunction with Caller ID service, the YoYo software displays the name and number of the person calling. You can also configure it to play different sounds depending on who's calling.

In addition, YoYo can automatically bring up the database records you've entered on a caller from the YoYo phone book or a YoYo-compatible personal information manager (PIM) such as Now Software's Now Contact.

YoYo's call-blocking feature is a great time-saver. The program can block calls from people you don't want to talk to,

and it can block calls at specified times. Unfortunately, you can't block certain calls at specific times, so as to keep your in-laws from calling during dinner.

MegaPhone's call-management features are particularly well suited for mobile users. With MegaPhone installed on your PowerBook, for example, you can change your "dialing from" location and easily adjust your outgoing dialing preferences (such as changing the first digit of every number from 9 when you're at the office to 8 when you're at a hotel). Handy boxes store phone-card access numbers and account numbers for billing purposes. A destination icon tells you the current time in the city you're calling, and the area-code data is a godsend.

Diamond Multimedia's VoiceMail offers basic voice-mailbox and call-handling capabilities. Because the software is essentially an updated version of Supra's Faxcilitate fax-management software, though, VoiceMail's strengths have more to do with managing incoming and outgoing fax transmissions.

**Voice Mail** YoYo doesn't include voice-mail capabilities. MegaPhone's voice-mail features are fairly basic—fast-forward, rewind, and time and date stamping. SupraSonic VoiceMail has a few noteworthy voice-mail features, such as a group of prerecorded celebrity-soundalike greetings (a Bill Clinton impersonator says, "Someone will get back to you, as long as Hillary says it's OK").

**Address Books** If you've already spent hours typing names and phone numbers into a PIM, the last thing you want to do is duplicate the effort. Nonetheless, that's the situation you're likely to face when trying to import PIM data into a call-management program.

All three programs gave me comparable headaches when I was trying to import data from PIMs into their address books. When I tried to import phonebook information from Now Contact into MegaPhone, for instance, I received cryptic messages such as "An error occurred while getting a contact from the PIM; unable to coerce data." I ended up with columns headed only by letters, not words. In addition, MegaPhone's address book is limited to 400 phone numbers. Hello? I have 50 contacts at Apple Computer *alone*.

**Conclusion** YoYo, with its ease of use, ability to maximize Caller ID, call blocking, and other features, is the hands-down winner among the call-management programs.

### Single-User Telephony: Internet Phone

VocalTec's Internet Phone 3.0 (*http://www.vocaltec.com*) is the only Mac application I evaluated that lets you place long-distance voice calls over the Internet. With a flat monthly rate for Net access, a PlainTalk microphone, and Mac or Windows Internet Phone software on both ends of the line, you can chat up a storm without incurring long-distance or hourly online charges. (For now, anyway; the long-distance companies are already lobbying to block this free ride through FCC regulations, and are, at a minimum, looking for ways to profit from this trend. Stay tuned for more.)

I had a lot of fun with

**Push-Button Phone, Done Right** The best part about telephony products is that they give you a better interface for dialing than your phone does. Among the features of Cypress Research's MegaPhone dialing interface, for instance, is the Backspace key, a handy way to correct a misdialed number.

## Top-Gun Telephony

DESKTOP TELEPHONY PRODUCTS, SUCH AS BIG ISLAND Communications' YoYo and STF Technologies' Front Office, represent the most basic merger of telephone and computer. Further up the scale is a class of CTI products designed to channel incoming calls and information from a PBX (private branch exchange) phone system to Macintoshes and other personal computers.

These client-server networking applications offer a number of complex call-routing and -managing features for large companies and corporations and can cost up to tens of thousands of dollars, depending upon the number of users. Here's a peek at two Mac applications available for high-end telephony.

**PassageWay** AT&T spin-off Lucent Technologies (908/582-3000, *http://www.lucent.com*) offers PassageWay, a call-center application codeveloped with Novell that routes incoming calls to customer-service representatives (for 100 users, the cost is $2400). With PassageWay, a company's customers calling with questions can input their account numbers from their telephones. After the database matches the account number, the customer's account history pops up on a service representative's monitor.

While PassageWay is cross-platform, with client software for the Macintosh, Windows, Windows NT, and Unix operating systems, not all of its capabilities—such as system administration tasks—are available for the Mac. Also, as you might expect from an AT&T spin-off, PassageWay only works with AT&T'S Definity G3 PBX system.

**VisitVoice** Similarly, VisitVoice call-management software from Northern Telecom (214/684-0000, *http://www.nortel.com*) requires that you use either a Nortel Meridian 1 PBX or digital Centrex capability from your regional phone company. Combining call management and voice mail, VisitVoice lets you click on phone icons to initiate outbound dialing and click on incoming phone messages (just as you would incoming E-mail messages) to play them. VisitVoice is available for Macs and Windows PCs, and costs from $650 for 10 users to $4000 for 100 users.

# Calling All Macs

| Company | Product | Star Rating * | List Price/ Company's Estimated Price ** | Phone | Additional Hardware Required |
|---|---|---|---|---|---|
| **Single-User Software** | | | | | |
| Big Island Communications | Editors' Choice YoYo | ★★★★/8.5 | $150/$139 | 408/342-8300 | none |
| Cypress Research | MegaPhone 1.02 | ★★★★/7.0 | $100/$50 | 408/486-7900 | GeoPort adapter, Global Village Teleport 2V or Platinum V, U.S. Robotics Sportster Voice, SupraFaxmodem V.32bis |
| Diamond Multimedia | SupraSonic VoiceMail | ★★★/6.7 | $289/$289 | 360/604-1400 | none |
| Sagem | The Phone | not rated | $195/NP | 408/446-8690 | Planet-ISDN card ($429) |
| Third Planet Publishing | DigiPhone for Mac | not rated | $90/$50 | 214/733-3005 | PlainTalk microphone |
| VocalTec | Editors' Choice Internet Phone 3.0 | ★★★★/8.1 | $50/NP | 201/768-9400 | PlainTalk microphone |
| **Multiuser Software** | | | | | |
| Cypress Research | Voice Messenger | ★★★/5.5 | $149/$100 | 408/486-7900 | GeoPort adapter, Global Village Teleport 2V or Platinum V, U.S. Robotics Sportster Voice, SupraFAXmodem V.32bis |
| Pacific Image Communications | SuperVoice 1.03 | ★★/4.8 | $130/NP | 818/457-8880 | Best Data 2834VLX |
| STF Technologies | Front Office 1.5 | ★★★/5.3 | $299/NP | 213/259-1710 | GeoPort adapter ($129) |

*NP = Not provided. * Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) ** Actual prices could be higher or lo*

Internet Phone. All you have to do is install it, click on the Call button, and type in the desired Internet address. The person you're calling must be at his or her computer, with Internet Phone software running, to accept your call. There's a slight but noticeable delay in voice transmission, and the sound quality can range from that of a cordless phone to that of an overseas call to a faraway country, depending on, among other things, your proximity to the person you're calling.

You can download Internet Phone from VocalTec's Web site and try it for a week. You'll find people all over the world trying it out as well—the software automatically reveals a list of Internet Phone chat rooms. You'll probably notice some focusing on adult topics. Fortunately, Internet Phone includes a filtering capability that prevents the software from listing chat rooms that contain words you've deemed undesirable.

**Conclusion** It's not clear how long you'll be able to make free calls over the Internet. Nonetheless, a $50 investment in Internet Phone is worth it. The program is easy and fun to use, and can be a real money saver.

## Multiple-User Telephony: The Mac as Party Line

Like the single-user products, the multiuser telephony applications offer very different features and capabilities, which makes comparisons difficult. Cypress Research's Voice Messenger, for instance, focuses on voice mail. Front Office 1.5, recently sold to STF Technologies (*http://www.faxstf.com*) by Pleiades Research, adds a fax-back capability so that potential customers can call in, input their fax numbers, and have the Macintosh automatically fax them material. Pacific Image Communications' SuperVoice includes voice mail, faxing, and an internal BBS for uploading documents—such as color proofs—that can't be faxed.

**More Than the Fax** You can tell from the fax-machine icon and the "No Fax File Selected" message on screen that Diamond Multimedia's SupraSonic VoiceMail application has its origins as fax software. But it's still easy to use for making calls—type in the number you want, select dial, and you're off.

These programs share some common negative traits, however: they were difficult to install and use and frequently had poor documentation.

**Installation** Installing and setting up the multiuser telephony programs requires a time commitment and dedication beyond the casual user's capacity. To make sense of the installation, you need a strong grounding in flowcharts and workflow, because you have to carefully plan user extensions and the pathways remote users will follow when they're pushing buttons on their telephones.

It's so difficult to set up these programs, in fact, that you can introduce errors that come back to haunt you. When I tried to send a fax with SuperVoice, for instance, I got an error message

| Comments |
| --- |
| |
| Combined with voice mail and Caller ID, this is the most full-featured call-management program for the Mac. |
| Great for automated dialing, but phone book is disappointing. |
| Better integration would move this beyond fax software with a voice-capability module. |
| An ISDN-based application for incoming and outbound call management. |
| Set to ship in late summer 96, this will include Caller ID and full duplex speakerphone capabilities. |
| Software for telephoning toll-free over the Internet is easy to set up (once MacTCP is installed) and use. |
| Has a clean and simple interface, but would benefit from easier setup. |
| The only product to offer a BBS for data transmission, but suffers from glitches. |
| Nicely retrieves calls that have gone into voice mail, but program is too difficult to set up. |

*than the estimated street price provided by the company.*

saying that the attachment had to be a vox (voice) file. It turns out that a bug in SuperVoice gives you this message if the modem isn't set up properly.

**Documentation** In general, the documentation with these programs isn't much help at all. The Voice Messenger documentation, for instance, comes with an electronic manual you must access page by page. When printed, it comes to 125 pages, much of it white space.

In some cases, program features or elements aren't even explained in a manual—for example, a button on the Preferences screen in Front Office called Phone Interface. This is an important setting, as it's where you indicate your modem type and your outgoing phone number—yet the manual never explains it.

**Voice Mail** In theory, voice mail on your Mac is a great idea—you can buy one of these programs for anywhere from $50 to $300 and load it up on a Mac to use for voice mail. Compare that with anywhere from $2500 to $25,000 for a typical voice-mail system, and it's a bargain. The reality, though, is less than ideal.

Of the three programs, Front Office has some of the best voice-mail features. In particular, I appreciate the Interrupt button, which allows you to pick up a call even after it's gone into voice mail—something you can do with an answering machine but not with most proprietary voice-mail systems.

Front Office is still a product in transition, having recently been sold to STF Technologies. The program's future, as a result, remains to be seen—one reason I'm reluctant to recommend it.

I really enjoyed editing my own message with Cypress Research's Voice Messenger, too, but overall, the other programs' voice-mail features are too often more trouble than they're worth. When I tried to record an outgoing message with SuperVoice, for instance, recording started without a problem. But clicking on the Stop button was useless; I had to force-quit the application (none of the suggestions of the company's technical-support staff solved the problem). And SuperVoice doesn't allow you to import numbers into its phone book—you have to type them in individually.

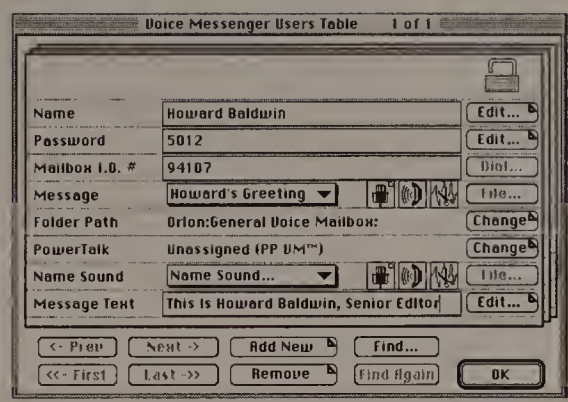
**Conclusion** Overall, the multiuser telephony programs just don't deliver on their promises, and they ask too much in patience and setup time to make them truly worthwhile. Small to medium-size businesses would be better off for now with a traditional voice-mail system.

## The Last Word

Two products in the single-user category—YoYo and Internet Phone—earned an Editors' Choice because they're easy to use and offer worthwhile features. The other products in that category—SupraSonic VoiceMail and MegaPhone—are worth considering as well, although they aren't quite as straightforward.

In general, though, the current state of Mac telephony is a bit disappointing. It seems that, as with the multiuser programs, the more ambitious telephony programs become, the more they come up short. And despite the fact that telephony has been around for several years now, only seven Mac applications were available for my evaluation—not exactly a sign of a competitive product category.

Nonetheless, the future of Mac telephony looks bright. Earlier this year, Apple announced it was abandoning its Mac-only GeoPort hardware and was evolving GeoPort software to be compatible with the new FireWire 400-megabits-per-second interface, which will soon appear in both Macs and Windows PCs. This is significant news: there will be more incentive to develop Mac telephony applications because they can be ported more easily to Windows.




**The Macintosh as Mailbox** Setting up voice mailboxes for users is pretty easy using the Add New, Edit, Change, and other buttons in Cypress Research's Voice Messenger software. PowerTalk, Apple's recently discontinued speech-recognition product, isn't necessary for using Voice Messenger.

So who knows? With luck, soon your office phone and desktop computer will merge into one powerful, easy-to-use workstation; the possibilities are endless. But even if that golden day never arrives, at least you'll be able to get your calls back from voice mail. **m**

Senior editor HOWARD BALDWIN has written about all kinds of telephony applications.

### MACINTOSH TELEPHONY

MW EDITORS' CHOICE It wasn't enough for these applications to work well; for an Editors' Choice designation they had to demonstrate synergy between the Mac and telephone, making the combination easier and more useful than the two technologies used separately. Only two single-user products filled the bill.

★★★★/8.5 **YoYo** Inexpensive and easy to set up, YoYo offers a number of convenient call-management features and comes with its own telecommunications hardware. **Company:** Big Island Communications (408/342-8300, *http://www.big-island.com*). **List price:** $150.

★★★★/8.1 **Internet Phone 3.0** It's like a passport to call anywhere in the world free (for now, at least), and it's extremely easy to use for both person-to-person and chat-room communications. **Company:** VocalTec (201/768-9400, *http://www.vocaltec.com*). **List price:** $50.

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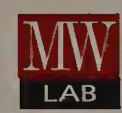



# Motorola's Hot New Macs

by Galen Gruman

**FINALLY, A BIG-TIME** systems company has entered the Macintosh market—and it's done so in a big way. Motorola Computer Group (800/759-1107, *http://www.mot.com*)—a division of the giant company that produces pagers, cell phones, modems, Unix and Windows NT workstations, and all sorts of computer chips—has introduced its StarMax series of Mac-compatibles. And Motorola has endowed them with a new motherboard architecture that keeps cost down yet provides fast performance.

How fast? Motorola loaned *Macworld* a StarMax 3000 MT603e-200 for exclusive hands-on testing for this article. That prototype 200MHz PowerPC 603e–based system beat the Apple Performa 6400/200 by 5 percent, and it beat a prototype Power Computing PowerBase 200 by a healthy 14 percent. It even beat a PowerBase 240 by 3 percent, despite the PowerBase's faster CPU. The speed advantage appears to be due to two factors: the StarMax's fast hard drive and its new motherboard design.

The StarMax's prices will be competitive as well: Motorola expects the well-equipped MT603e-200 StarMax 3000 minitower system to cost about $2700, compared with $2475 for a similarly equipped PowerBase 200 and $2875 for a PowerBase 240. A comparable Performa 6400/200 costs $2975. Motorola says it won't finalize its pricing until it ships the systems on November 4, so it can react to its competitors' pricing.

KEVIN CANDLAND

### Welcome to Tanzania

The StarMax Macs use a new kind of motherboard design, named Tanzania and codesigned by Apple and Motorola (see "Apple Unveils Its New Platform Design," *News*, *Macworld*, June 1996). The other Mac clones use one of Apple's existing motherboard designs: the Alchemy design from the Performa 5000 and 6000 series, used in Power Computing's PowerBase and Umax's Typhoon systems; the Catalyst design from the Power Mac 7200, used in the Power Computing PowerTower Pro and Umax SuperMac J700; and the Tsunami design from the Power Mac 9500, used in the Power Computing PowerTower, DayStar Genesis, and Umax SuperMac S900.

Tanzania is a sort of "CHRP lite," a design that weans the Mac design away from many of Apple's proprietary parts and supports several PC technologies (VGA, Enhanced IDE, and PS/2 serial). But unlike the full Common Hardware Reference Platform design (see "CHRP Gets a Boost," *News*, in this issue), it does not completely divorce itself from the Mac OS's hardware dependencies. A CHRP system needs to run a special version of the Mac OS that doesn't look for specific Apple components, while a Tanzania system still looks for these because it runs today's Mac OS.

Motorola expects Tanzania and CHRP designs to coexist for at least a year, since Tanzania designs are cheaper. Motorola expects CHRP to be used in more expensive, power-user systems that could also run Windows NT and have many more expansion options.

### Two Lines, One Design

The StarMax systems come in two lines: the 3000 series and the 4000 series, which have the same core designs and options.

**CPU and RAM** The StarMax comes with a CPU soldered on the motherboard, rather than on a replaceable card. Motorola says only 5 percent of PC owners upgrade their CPUs, so it figures saving the $25 cost of offering such an upgrade is worthwhile.

The StarMax 3000 series uses a PowerPC 603e CPU and a 256K cache

### Motorola Launches Eight Mac Systems

| Model | RAM | Hard Drive |
|---|---|---|
| **StarMax 3000*** | | |
| DT603e-160 | 16MB | 1.2GB |
| MT603e-160 | 32MB | 2.5GB |
| DT603e-200 | 16MB | 1.2GB |
| MT603e-200 | 32MB | 2.5GB |
| **StarMax 4000*** | | |
| DT604e-160 | 16MB | 1.2GB |
| MT604-160 | 32MB | 2.5GB |
| DT604e-200 | 16MB | 1.2GB |
| MT604-200 | 32MB | 2.5GB |

**DT = desktop, MT = minitower, 160 = 160MHz PowerPC 603e, 200 = 200MHz PowerPC 603e.*

card. Motorola expects prices to range from $1700 to $2700.

The StarMax 4000 series uses a PowerPC 604e CPU and a 512K cache card. Motorola expects prices to range from $2400 to $3500. There are also three DIMM slots. The DIMM banks aren't interleaved, so you can mix capacities freely.

**Video** The 3000 series comes with 1MB of VRAM (supporting thousands of colors on a 14-inch monitor), while the 4000 series comes with 2MB (supporting thousands of colors on a 17-inch monitor). The on-board circuitry, expandable to 4MB, does not accelerate 3-D graphics (the PowerBase's circuitry does).

Also, the StarMax uses only a VGA video connector, not the standard Mac connector, so if you have an Apple monitor, you'll need a $20 adapter.

**Expansion** You have a choice of a desktop case or a minitower case. The desktop case has three PCI slots and four drive bays (three 5.25-inch and one 3.5-inch), while the tower case has five full-length PCI slots and seven drive bays (five 5.25-inch and two 3.5-inch). The included 8× CD-ROM drive takes one of the 5.25-inch bays, while the floppy drive takes a 3.5-inch bay.

The StarMax has two Enhanced IDE connectors for internal drives (the CD-ROM drive uses one connector), as well as one external SCSI connector. You also get two Mac serial ports, one ADB port, two PS/2 serial ports (the kind used in many PCs), a microphone jack, and a speaker minijack. An ADB mouse and extended keyboard are included.

Mice, keyboards, joysticks, and the like connected to the PS/2 ports need no special drivers to function, although PC-specific capabilities (such as the extra buttons on PC mice) won't work. While it's possible to write drivers to enable such functions, Motorola has no plans to provide any. (I do wish the company would write a control panel to let you assign keystrokes to a PS/2 mouse's extra buttons.)

**Warranty** In a push to differentiate itself from the other systems makers, Motorola is offering a five-year warranty for the StarMax systems. The other Mac makers offer one-year warranties, although Power Computing sells warranties for longer periods.

Motorola plans to sell the StarMax Macs throughout the world, including the United States, Canada, Japan, China, Taiwan, Europe, and South America. The first systems will be available just in North America, but by April, Motorola hopes to have local-language versions available overseas.

In the United States and Canada, you can expect to find Motorola's Macs from two major sources: via distributors who sell to corporations and via mail-order distributors. Motorola expects to sell many StarMax systems to companies that also buy Windows NT servers and desktop systems, which Motorola makes.

### The Last Word

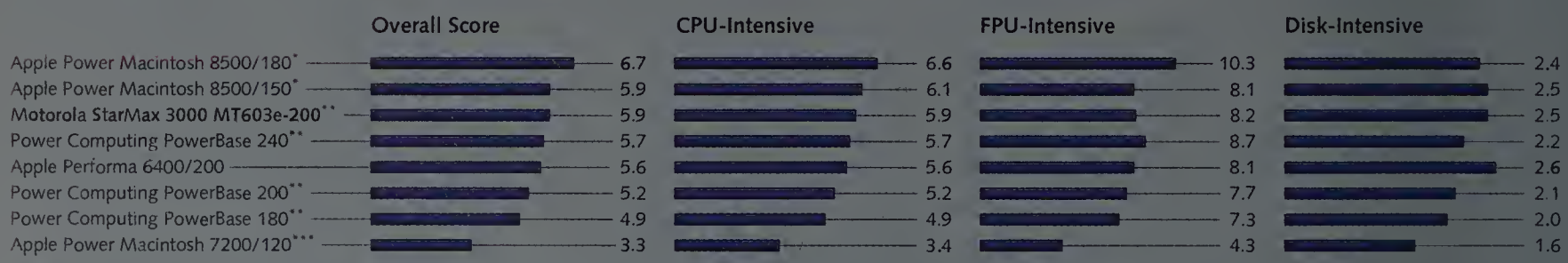
Motorola is entering the Mac market with a big bang. My Macworld Lab colleagues and I were very impressed with the StarMax prototype's design and performance. The StarMax is the kind of system that should give PCs a run for their money and show once and for all whether Macs can expand into PC territory, after the barriers of high price and limited availability are gone. While Power Computing pioneered the Mac-clone market and established it as viable, Motorola brings the weight and confidence of a major player. **m**

Executive editor GALEN GRUMAN reports on Mac-system developments and technologies.

## Motorola's First Mac Makes an Impressive Debut

And you thought the PCI Power Macs last fall and winter were fast. The 200MHz Motorola StarMax 3000's performance (highlighted in boldface) is nothing short of impressive. It was able to outrun the faster 240MHz PowerBase from Power Computing due to a faster internal IDE drive and newer motherboard design. The StarMax's superb performance is yet another sign that the consumer-oriented Macs—systems powered by 603e PowerPC CPUs—are now performance contenders, unlike early 603-based systems. For details on our tests, see "The New Speed Champs," July 1996.—**Macworld Lab testing supervised by Mark Hurlow**

**Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed from fastest overall to slowest overall.**




Indicates typical performance in a mixed-use environment, such as a company or school.

Indicates performance for most business and personal tasks.

Indicates performance for analytical, 3-D, and other specialized uses.

Indicates performance of the Mac's data-transfer capability, which affects all users.

** Uses a PowerPC 604e CPU. **Prototype system. ***Uses a PowerPC 604 CPU; tested without the optional 256K cache card.*

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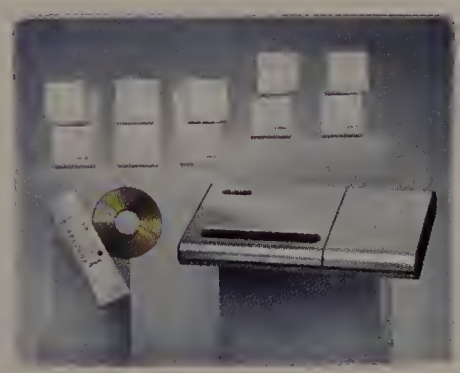

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# SECURE YOUR MAC

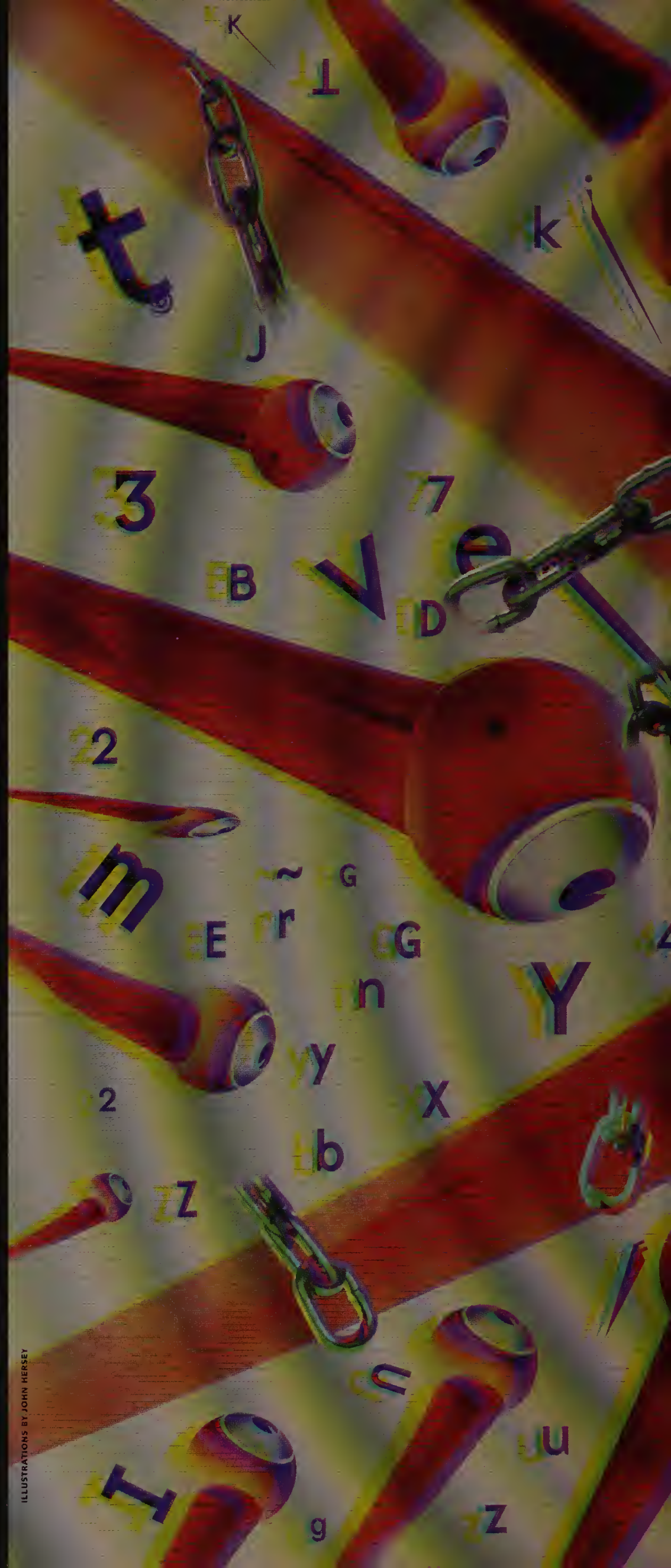
**WHETHER FROM MISCHIEF OR MISHAP, HERE'S A PLAN TO PROTECT YOUR DATA**

**THE FOLLOWING STORY IS SAD BUT TRUE.** Long before the Macintosh set off the desktop publishing revolution, I worked on one of those old phototypesetting computers. You remember them—proprietary, dedicated systems that had 8-inch floppy drives, if they had floppy drives at all. They ran preinstalled typesetting software and nothing else, not even a screen saver.

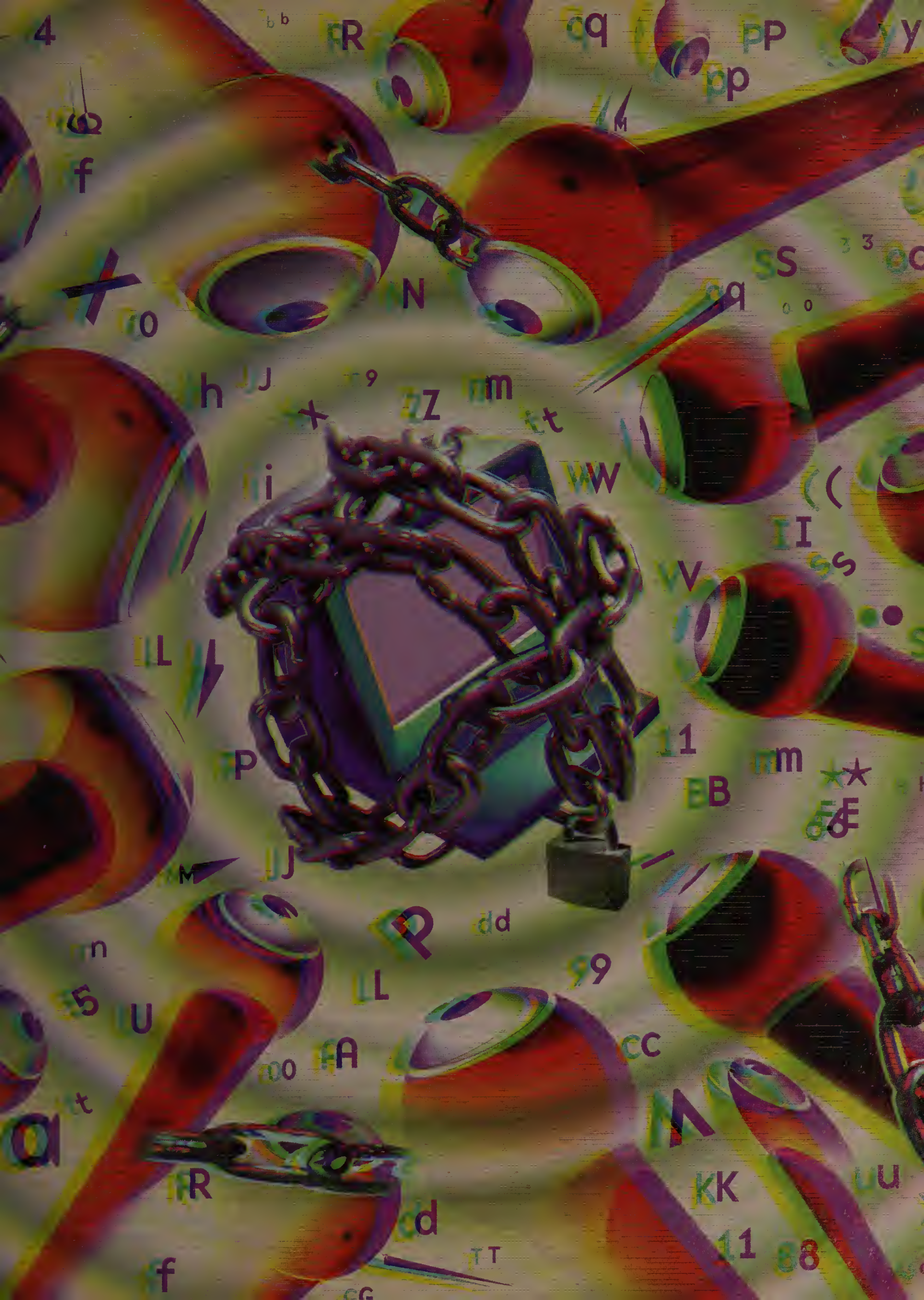
You'd think such a system would be immune to tampering, but sure enough, one day in the late eighties, an employee suddenly disappeared, along with a number of disks containing customer jobs, fonts, and program updates. It took us weeks to redo the missing jobs, and some of those clients we never saw again.

by Gene Steinberg

All this is a prelude to an important point: If someone could muck up a dedicated system that easily, imagine what he or she could do with an easily accessible Macintosh. Now, it's simple to copy software and take it elsewhere. And if anyone bore a grudge against your company, he could alter, corrupt, or even delete files at will. That's why you need security software.



ILLUSTRATIONS BY JOHN HERSEY



### Protecting Your Mac

Personal computing is generally safe—if you work alone. But as soon as you let others use your Mac, your valuable files, including your private financial records, are at risk. And a virus infection introduced into your system (even by accident) could corrupt your files.

To help you protect yourself, your data, and your Mac, we collected 24 programs that promise some level of security, ranging from $39 to $249 (more for multiuser packages). Some of these programs restrict access to your hard drive, or to individual files and folders. Some even restrict copying files from your Mac. I also cover programs that can scramble (encrypt) files so they cannot be read by anyone without the right password.

You'll see which security features are most important, and which products are likely to work best with your system. And you'll learn which products can cramp your working style and restrict how you use your Mac. We'll also take a look at three of the commercial virus-protection packages, all designed to keep those pesky intruders from mangling your data or corrupting your hard drive.

In addition to covering security and virus software, we've included a sidebar on hard drive utilities, which check your hard drive for possible damage and provide additional features to make your hard drive run better (see the sidebar "Damage Control: Hard Disk Repair Utilities").

### Performance Hit

Everything has its price, and virus protection and security software are no exceptions. With maximum virus protection, programs may open more slowly. Since disk-protection programs usually write to the SCSI device driver, you can no longer use a disk-level compression program such as Stacker (since that uses the same driver). You may also find you are unable to install new software, optimize your hard drive, update your hard drive, or run basic background checks of your disks and data without first turning off or removing the security software.

If you wish to back up your hard drive, you may not be able to automate the process. Or you may have to grant special user access to allow the backup software to retrieve files automatically from protected disks.

Such common tasks as moving files into different folders or disabling the wrong system extension can suddenly stop a security software program from working. Worse, it may require removing the security program to use your Mac.

On top of all that, you have to remember that password. If you forget the password, and a copy of the password or a key disk to remove protection from the drive is not available, you're sunk. You are left with no option but to reformat your hard drive and lose every one of the valuable files you were trying to protect.

All this extra work can cost you more money in employee time and inconvenience. When choosing a security or virus protection program, weigh its benefits against the complexities you'll encounter.

### What Security Features Do You Need?

The 24 security programs covered in this survey offer various options for protection (see the table, "Security Checkpoints"). Before you buy a product, consider the level of security you need. You don't want to buy a vault when a safe will do, or a safe when a lock will do. Consider these eight important features.

- Hard disk security is probably the most elementary form of protection. It allows you to restrict access to a disk or partition with a password, but once you get access, you can use any of the files on that drive without restriction (not to be confused with the drive utilities covered in the sidebar).
- Folder protection grants access to specific folders on a hard drive. You can create a list of access privileges for each user.
- File protection, an extension of the folder-protection capability, allows only specific users to open a file. You can also grant separate access to allow users to change or delete files.
- Floppy drive protection allows you to decide whether a user can copy files to and from a hard drive or removable disk.
- Activity logs create a record of users who logged on to your Mac, for how long, and which files or disks they accessed.

## DAMAGE CONTROL
## HARD DISK REPAIR UTILITIES

THE SOFTWARE in this category doesn't so much protect access to your computer as keep files that are there already from being corrupted. Your hard drive's directory is like a table of contents. If that directory becomes garbled in any way due to a crash or a problem with your SCSI chain, your files may become damaged or inaccessible.

Every Mac comes with a little program called Disk First Aid that can check your drive for minor directory damage and fix some of it. If you want more-sophisticated disk diagnosis and repair, consider Symantec's Norton Utilities for Macintosh (a similar product from Symantec, MacTools Pro, is no longer being manufactured but is still available; upgrades to Norton Utilities are $40). In addition to tackling a wider range of directory damage than Apple's bundled utility does, these two programs provide tools to optimize your hard drive. Optimizing a drive moves all your data into contiguous spaces, so things run a little bit faster.

NUM, as it's known, can be set to scan your hard drive in the background, when your Mac is idle. And it puts up a message warning if a disk-directory problem is detected, and launches a disk-repair program.

The programs were comparable in detecting disk-directory damage, although I've found sometimes that one program will fix something the other cannot.

MacTools Pro, for example, has a feature called RAMBoot that creates a RAM disk on Macintoshes that support that capability. Unfortunately, Performa 5200, 5300, 6200, and 6300 models and PowerBook 190 and 5300 models couldn't use this feature, nor could

• Time-limited access establishes a time frame during which someone can use your Mac. You can combine this with the limited-access choices above.

• File shredding provides secure erasing of sensitive files so they cannot be retrieved using one of the file-restoration programs, such as those available with MacTools Pro or Norton Utilities for the Mac (this is what would have kept Oliver North out of court).

• File encryption allows you to scramble a file so that only someone who knows the right password can open it. Contrary to the scene in Arnold Schwarzenegger's *True Lies*, even a top espionage agent couldn't crack encrypted records in a matter of minutes. If the files were encrypted using the National Bureau of Standards' Data Encryption Standard (DES), it might be impossible to unscramble them (so long as your password is hard to guess). Fortunately, a DES-based algorithm is included in all the programs in our survey that offer file encryption.

**Locks, Safes, and Vaults**

If you just need simple password protection for your hard drive, a disk-formatting utility such as FWB's (415/325-4392, *http://www.fwb.com*) Hard Disk ToolKit or La Cie's (503/520-9000, *http://www.lacie.com*) Silverlining may be sufficient. Both let you create a password that is written directly to the SCSI device driver. You cannot open a disk without the password, even if you start your Mac with system extensions off, or from another drive. But if you need a greater level of protection, or your hard drive software doesn't offer a protection option, you'll need to take the next step up the security chain.

Hard disk protection is at the core of most security products. usrEZ Software's cypherPad also includes a screen saver that limits disk access after a preset amount of time. A fast, one-button installation puts the software on your hard drive and guides you through creating a password. (It's too bad that userEZ's other products are not as simple to use.)

Nearly all the drive-protection programs we tried had convenient installers and were reasonably easy to configure (although it's always good to read the manual). The programs all ran reasonably well, without initiating an unusual number of crashes. I did, however, have to chase down updates for ASD Software's (*http://www2.asdsoft.com*) FileGuard, Symantec's (*http://www.symantec.com*) Norton DiskLock, and SmartStuff Software's (*http://www.teleport.com/~smrtstuf*) UnderCover for the most reliable performance.

Moving up from basic hard drive security, Magna's Empower 5.0.4 adds controlled floppy disk access and DES-grade file encryption to the mix (version 5.0.5, which has a simpler interface, is now shipping). ASD's DiskGuard will protect both your folders and files, as well as the contents of your System Folder. If you need a greater level of protection, the company's FileGuard adds controls for application and floppy access, and sets limits on the amount of time a user can work on a Mac. In addition, FileGuard offers four encryption methods, including two variations of the DES standard.

Norton DiskLock controls access to folders and files and to applications, and also offers DES file encryption. I was especially impressed with its convenient Auto Setup feature, which lets you quickly configure your Mac for basic protection before you even crack open the manual to learn about the program's more sophisticated features.

On the basis of features alone, usrEZ's ultraSecure offers just about everything you're likely to need in security software. You can customize almost every element of user access to a Mac on multiple user levels. In addition, there's a secure erasure feature and three levels of file encryption (including two flavors of DES). If you can live without such features as limited-time user access control, save a few bucks and consider ultraShield instead.

These two programs offer installation procedures that will put off some users. Don't even attempt to install ultraSecure or ultraShield without reading an eight-page section in the manual that describes the process. You'll also want to study the manual carefully before using any of the program's advanced capabilities.

Power On Software's (*http://www.poweronsw.com*) On Guard offers a sophisticated level of protection for $70. A handy Finder-type menu makes the pro-

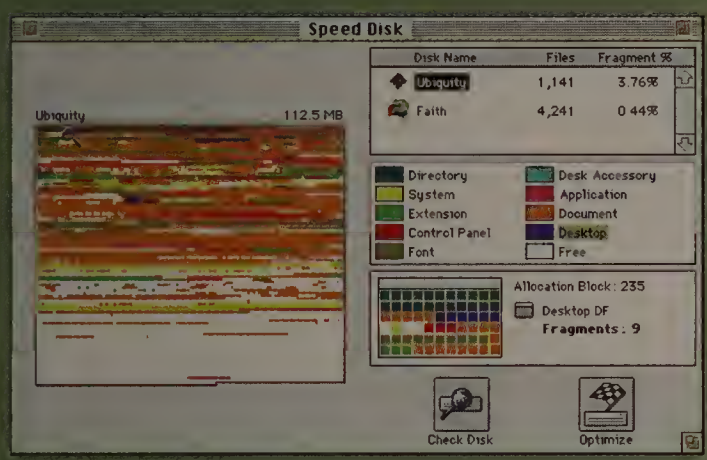
users of some of the Macintosh clones from DayStar, Power Computing, and SuperMac.

Of the two programs, MacTools is something of a memory hog. It requires a 68020 Mac or better with a minimum of 8MB of RAM, and its system extensions and start-up programs can use several hundred kilobytes of RAM on a Power Mac. If you're using an older Mac or have less RAM, you're better off making the move to NUM, which has much more modest system requirements.

Norton Utilities includes an emergency start-up disk that will boot all but the most recent Macs and clones. It also includes a Startup Disk Builder program that allows you to make a start-up disk using your Macintosh's Disk Tools disk, so you can make an emergency disk for some models that are not supported by the standard disk.

If the Emergency disk doesn't support your model, a system start-up CD is a good substitute. If you have a PowerBook or desktop Macintosh without a CD drive, contact Symantec to inquire about support for your particular model.

If you have MacTools and don't want to be left with an obsolete product, I suggest you upgrade to Norton Utilities. It's likely that future versions of Norton Utilities will incorporate some of MacTools' features.




**THE FRAGMENTS OF MY DISK** Opening the Speed Disk feature of Norton Utilities for Macintosh gives you a small magnifying glass (upper left) to determine whether your hard disk needs to be defragmented.

# IS IT SAFE OUT THERE?

## CHOOSE THE RIGHT TOOLS TO SECURE YOUR NETWORK PRIVACY

BY MEL BECKMAN

**AS A NETWORK** administrator, do you sometimes feel like Dustin Hoffman in *Marathon Man,* when Laurence Olivier drilled his teeth without benefit of novocaine? Are both users and management whining at you, "Is it safe? Is it safe?" In the movie, Olivier wanted Hoffman to confirm he could safely retrieve a cache of Nazi diamonds; in your life, it's your corporate jewels that are at stake.

You can protect those jewels using a combination of strategies: access controls to limit entry into your network and computers; encryption to hide data from prying eyes; firewalls to keep outsiders outside; and monitoring tools to ensure that evildoers don't go undetected. If you think you don't need such protections, consider a few common dangers. Internet hackers, after gaining illegitimate access, often steal valuable data and then destroy systems to cover their tracks. Disgruntled employees have been known to take vengeance by creatively altering accounting and database systems. And anyone can unobtrusively eavesdrop on network traffic, leaving no trace of the crime.

Lots of people are counting on you to keep them safe. Management holds you accountable for network security, as do users who expect privacy in their workplace and software vendors who will take you to court for license violations. Even visitors to your Web site want some assurances of security before transmitting sensitive data such as credit card numbers.

Alas, the Mac Operating System provides little in the way of built-in security to address these requirements. Serious protection requires third-party products, ranging in price from $200 to $1700. I looked at the gamut of Mac-oriented tools covering a range of protection options: data encryption, access controls, security monitoring, and software license management. While no one product is the be-all and end-all security blanket you might wish for, each adds a layer of protection to your network.

### First Step: Are the Doors Bolted?

So, how good is your security right now? An easy way to answer that question is to run Mr. Mac Software's (*http://www.mrmac.com*) Network Security Guard 3.1, which scans your network for unintentional guest access, poorly chosen passwords, and other security loopholes. You can even ask the program to ferret out every publicly accessible file on your entire LAN, which can be an eye-opening experience. A slew of reports tell you where to tighten security, and an audit feature can scan your network daily for repeat violations, automatically E-mailing you the reports. NSG's downside is its AppleTalk-only orientation. It ignores TCP/IP and NetWare (IPX) protocols, leaving some security lapses undetected.

Another kind of network monitoring looks for character, rather than network, flaws. Software license monitoring is a necessary chore given the police-state vigor with which vendors prosecute violations. This puts you in the unenviable position of license cop, keeping track of all your software licenses and making sure staffers are not exceeding their limits. Sassafras Software (*http://www.sassafras.com*) has a well-honed solution in KeyServer 4.1, an easy-to-install tool that lets you mark installed applications, then tracks them and enforces usage thresholds. Its many thoughtful features let you do this transparently. The version I tested was a delight to use but did not stop users from installing their own illegal software. At press time, however, Sassafras began shipping KeyServer 4.2, which monitors even for user-installed software.

Once you've found and plugged gaping holes, you can address less-immediate security threats, such as unauthorized access to your local computers and servers. While AppleShare provides password control for shared volumes, nothing built into the Mac will stop someone from sitting down at an unattended machine and using volumes that are already mounted. Worse, someone might just make off with an external hard drive or oh-so-convenient removable cartridge, taking it back to his or her den of iniquity for leisurely browsing.

ELS's Mac Manager 3.1 exists just to prevent such losses by providing both safe and impenetrable access protection and data encryption. Mac Manager's visible protection is a log-on screen that any would-be intruder must get past to reach your data. That data can be further protected using Mac Manager's optional Apple HD SC (Hard Disk SCSI) Protector utility, which encrypts your hard drive en masse and then decrypts it automatically as you use it. The only way to access encrypted data is to log on through Mac Manager. There are

powerful side effects, however. Mac Manager forces upon you one of three desktop interfaces resembling Mac OS 8, and performance is noticeably slower.

Maxum Development's WebLock 1.0 gives your Web server access protection similar to Mac Manager's password log-in. Based on AppleShare's Users and Groups access controls, WebLock prompts users for their user IDs and passwords before displaying non-public pages. Working with Quarterdeck's WebStar server, WebLock runs as a CGI (Common Gateway Interface) application that intercepts access to every Web page and verifies that the user is authorized. However, it may not coexist well with other CGI applications your Web pages require. This kind of control would be better implemented as a WebStar plug-in, and that's just what Maxum promises to do in the next WebLock release.

**Spy versus Spy**

As a network manager, you realize that LAN traffic is susceptible to interception. What you may not appreciate, however, is just how easily a non-technical eavesdropper can snoop around in your LAN. Network-monitoring tools, running on Macs, PCs, or Unix machines, make child's play of filtering packets for such juicy phrases as *password*. Worse, an attacker can do this remotely, once having broken into one of your on-site systems.

Atemi's (*http://www.atemi.com*) NetShade 1.1, which can encrypt all your AppleTalk traffic, is one defense against snooping attacks. Easy to install and configure, NetShade scrambles data using a proprietary algorithm that will foil all but determined sniffers, and these can be foiled completely using one of the optional munitions-grade DES (Data Encryption Standard) or Triple-DES encryption plug-ins.

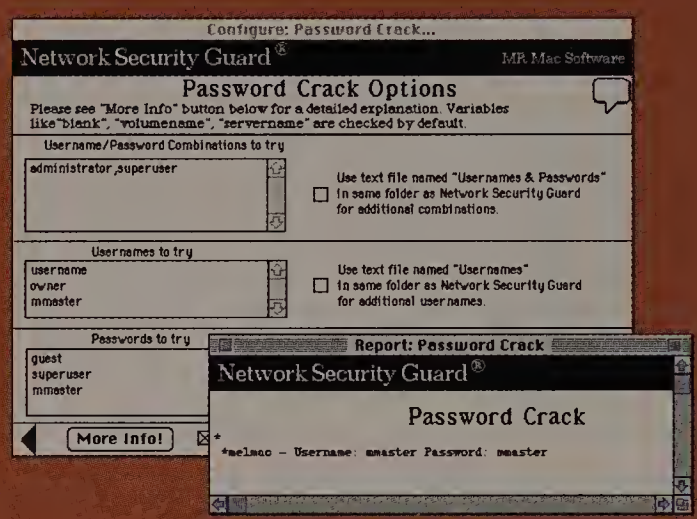
NetShade's own encryption scheme will protect your data from casual attackers; DES and Triple DES provide considerably improved protection. NetShade uses public-key cryptography behind the scenes to exchange secret keys safely between systems; frequent key exchanges limit damage in the event someone manages to decrypt your data.

The only downside to the advanced encryption algorithms is performance degradation. In tests, NetShade's default encryption slowed data transfer about 15 percent from unencrypted throughput of 5 Mbps, while DES dropped it to about 2 Mbps and Triple-DES to less than 1 Mbps.

The PowerPC-native encryption is even slower on 680X0 Macs. Still, it's nice to know you can have protection that even the National Security Agency considers impenetrable. There are holes, unfortunately: NetShade doesn't encrypt TCP/IP or IPX traffic, so Internet and NetWare file-sharing traffic is exposed. Ateni says the 2.0 version of NetShade will encrypt TCP/IP (but not IPX).

Just as LAN traffic can be intercepted, so can Internet traffic, which exposes your corporate Web server and other network services talking across insecure wide area networks. Quarterdeck comes to the rescue with its WebStar SSL Security Toolkit, which lets you use transparent encryption to exchange sensitive data safely with popular SSL-capable Web browsers such as Netscape's Navigator and Microsoft's Internet Explorer. Any of your Web pages can initiate a secure session, quietly yet safely exchanging public encryption keys with a requesting browser and then encrypting subsequent traffic with one of three algorithms, DES (least secure), RC4-40, and RC4-128 (most secure). Any of these algorithms significantly slows Web access, so you'll only want to secure selected pages, such as order-entry forms.

WebStar's protection doesn't come cheap, however: at $1295 plus $295 for the required Digital ID from VeriSign (415/961-7500, *http://www.verisign.com*), WebStar SSL is double the price of the regular WebStar product.




**THE BIG AUDIT** Mr. Mac Software's Network Security Guard audits your AppleTalk network for serious security flaws, automatically E-mailing you regular status reports.

If you want to protect more than just Web traffic on the Internet, you need multiprotocol encryption, and currently that's available only through external hardware, in the form of an encrypting router. For example, Network Systems' (*http://www.network.com*) economically priced BorderGuard Access Router is both an Internet firewall and an encrypting router. By itself, BorderGuard can block hacker attacks from the outside and help prevent unscrupulous employees from exporting corporate secrets from the inside.

BorderGuard's true value, however, comes when two or more units communicate with each other across the Internet. When configured to do so, cooperating units set up encrypted information channels—through which you can transfer both AppleTalk and IPX traffic, as well as TCP/IP—letting you safely use the Internet as an inexpensive alternative to a private wide area network. Beware, however; configuring BorderGuard requires considerable Net savvy. You might easily spend as much as the cost of the router just having a consultant configure one.

### The Last Word

Are these tools everything you need to lock up your network? Unfortunately, no. You'll also need tools for onetime passwords, such as Security Dynamics' (617/547-7820, *http://www.securid.com*) SecureID, which uses a credit card–size device to generate fresh passwords every minute. Also lacking are serious security audit tools, such as COPS (Computer Oracle and Password System), Rscan, and SATAN (Security Analysis Tool for Auditing Networks)—Unix programs that seek out subtle security lapses, not just obvious ones. However, a number of vendors are poised to deliver Mac-oriented security products in the near future, which means you won't have to rely on a stable of one-trick ponies to keep your network safe.

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Contributing editor MEL BECKMAN (*mel@becknet.com*), a consulting network engineer, helps companies develop their Internet connection strategies.

gram especially easy to configure. Site administrators will appreciate the ability to set access options from across a network. You can also lock a disk so it cannot be accessed from a separate start-up floppy or hard drive. Another great feature: you can turn off the option that lets anyone restart your computer with the extensions off (as this will override On Guard).

On the surface, FoolProof, from SmartStuff, seems a powerful program, offering many of the features desirable in first-rate security. However, it also puts some important limits on your Mac's usability. For example, the program is not compatible with any desktop programs, including Apple Computer's desktop printing software. Also, if you use Apple's Control Strip, you must disable it because it allows you access to protected software.

FoolProof's Achilles' heel, though, is that it lets you start your Mac with extensions off and remove its protection. You can get around that limitation with one of the optional extras, a SuperINIT that installs in the System Folder to prevent anyone from overriding the program by booting with the extensions off. But that doesn't prevent anyone from booting your Mac from another disk. (After testing ended, SmartStuff announced FoolProof 3.0, which will add log-in, network management, and software distribution features; the new version is scheduled to ship in September.)

Claris's (*http://www.claris.com*) At Ease also didn't perform as well as other products in this group. It is more of a personal security program designed to restrict child or student access to your Mac. But it can also be easily defeated with a Disk Tools floppy or a separate start-up disk.

### One-Trick Ponies

If you just want to protect individual files or folders, you might consider some additional options. These programs may also be helpful supplements to a basic security program that doesn't offer a similar feature.

SmartStuff Software's UnderCover, for example, creates a hidden and password-protected folder to keep files from prying eyes. ViaCrypt's (*http://www.viacrypt.com*) ViaCrypt PGP and AT&T's (*http://www.att.com/bcs/secure_software/SAsoftware.html*) SecretAgent encrypt files and provide digital signatures to allow you to authenticate the identities of those who send you E-mail.

The AT&T program was easy to set up and, with a careful study of the manual, fairly simple to use. It offers the added benefit of being compatible with the MS-DOS, Windows, and Unix versions.

On the other hand, ViaCrypt PGP wins the award for the most difficult program to set up, hands down. The bizarre process is much, much worse than the steps required for setting up ultraSecure or ultraShield. To get ViaCrypt PGP running, you have to copy the appropriate program files manually to your hard drive (either for 680X0 Macs or for the rest). Then you have to rename each file before use, precisely as shown in the manual. It's definitely not for a beginner.

**Filling Up Your Screen** The large icons and directory display in Magna's Empower can fill up your screen fast if you choose to set all of its user options.

### Infection Protection

All the foregoing products protect you from snoops inside your office. But what about prying from the outside? Every so often the media report a big breakout, but you need to be aware of viruses constantly. A computer virus is basically a piece of code, added to a file, that replicates itself when the file is copied from one disk to another. Once a virus is created, it can spread easily from machine to machine within days. It may just put a silly message up on your Mac's screen. But it can also tamper with your software and even wipe out the data on your hard drive.

Unlike what you see in some popular movies, computer viruses aren't written to defeat spies or invaders from another planet. Viruses are written by people who want to play a prank (such as preventing you from typing vowels on your keyboard, as with the NVP virus), or by someone with a malicious intent. No matter what, the unprotected computer pays the consequences.

Any time your Mac receives files from other computers, even files you download via modem, it is vulnerable to virus infection. While the major online services and any responsible BBS system operator will check their files carefully before they're made available, there's still plenty of room for viruses to infect your system.

These programs will check your files for suspicious code. If a virus is found, the program will warn you of the virus's presence before it can do any damage. The program will also offer to repair the infected file, but since the process isn't 100 percent reliable, reinstalling the file from a fresh copy is the best solution (after the virus is removed, of course).

As new viruses are discovered, programs must be updated to search for additional types of infection. An update can be downloaded or distributed in the form of a new set of search strings, or as an application that actually stores the new detection capability in the program itself.

Virus problems on Macintoshes used to be few and far between, but the ad-

## NINE NUGGETS FOR DATA PROTECTION

ONCE YOU'VE selected the security program that fits your needs, here are a few things you should consider to get the maximum benefit from your newfound protection.

**1.** Make regular backups of all your data—once a day if you produce a large number of sensitive documents. Hard drive failures, while uncommon, do happen. Even the best hard disk repair techniques cannot always recover your data.

**2.** If possible, protect your backup files. in order to back up your data you often must grant a special user privilege to allow the data to be copied automatically to the backup device. Dantz Development's Retrospect (510/253-3000, *http://www.dantz.com*) offers a solid password-protection scheme for backup files.

**3.** Choose passwords with care. Your name and birth date may be guessed easily by a password sniffer. A random combination of letters and numbers is the most difficult to crack. It's also a good idea to change your password regularly.

**4.** Follow the guidelines in the previous item when you create a password for your online service or Internet provider. Online service representatives also warn that you should never disclose your password. Their own employees will never ask you for it.

**5.** In a safe place, keep a written record of your administrator password and all user passwords. That way you can quickly help a user who forgets a password get back to work.

**6.** Make backups of all your security-software disks. With some programs, backdoor or removal utilities require the master disk.

**7.** Keep your backup disks, password information, and security-software disks under lock and key.

**8.** If your work site has sensitive data, it's also a good idea to keep backup copies and security software information at a location away from your work site, such as a bank safe-deposit box.

**9.** When employees leave your company (on a friendly basis or otherwise), immediately change any passwords they knew.

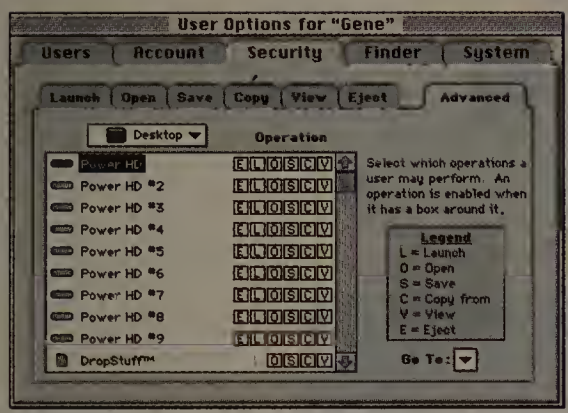
## SECURITY CHECKPOINTS

| Company | Product | Star Rating * | List Price | Telephone | Features |
|---|---|---|---|---|---|
| **DESKTOP SECURITY** | | | | | |
| ASD Software | DiskGuard 1.5 | ★★★★/7.3 | $79 | 909/624-2594 | Protects hard disk, files and folders, System Folder, offers screen locking. |
| | Editors' Choice<br>FileGuard 3.0 | ★★★★/8.0 | $139 | 909/624-2594 | Protects hard disk and floppy disk, files and folders, and applications; limits when computer can be used; offers screen locking, encryption, and secure erasure. |
| AT&T | SecretAgent 3.0 | ★★★/6.1 | $249 | 847/405-0390 | Encryption. |
| Claris | At Ease 3.0 | ★★/4.1 | $49 | 408/987-7000 | Protects hard disk and floppy disk, files and folders, and applications. |
| Datawatch | Virex 5.6.7 | ★★★/6.9 | $100 | 508/988-9700 | Virus detection, scheduled virus scans, password protection. |
| Magna | Empower 5.0.4 | ★★★/6.0 | $129 | 408/879-7907 | Protects floppy disk, file encryption. |
| McAfee Associates | VirusScan 2.0 | beta/not rated | $65 | 408/988-3832 | Virus detection, scheduled virus scans, password protection. |
| Power On Software | On Guard 2.1 | ★★★★/7.1 | $70 | 216/735-3116 | Protects hard disk and floppy disk, files and folders, and System Folder; limits when computer can be used; and network administration options. |
| SmartStuff Software | FoolProof 2.5 | ★★/4.9 | $39 | 503/231-4300 | Protects hard disk and floppy disk, System Folder, and applications. |
| | UnderCover | ★★/4.3 | $39 | 503/231-4300 | Protects files, folders, and applications; offers encryption. |
| Symantec | Norton DiskLock 4.0 | ★★★★/7.9 | $129 | 541/984-2490 | Protects hard disk, files and folders, System Folder, and applications; offers screen locking, encryption. |
| | Norton Utilities for Mac 3.2 | ★★★★/7.7 | $149 | 541/984-2490 | Disk repair and data recovery. |
| | Symantec AntiVirus for Macintosh 4.0.8 | ★★★★/8.1 | $70 | 541/984-2490 | Virus detection, scheduled virus scans, password protection. |
| usrEZ Software | cypherPad | ★★★/6.2 | $49 | 714/756-5140 | Protects hard disk; offers screen locking. |
| | ultraSecure | ★★★★/7.0 | $239 | 714/756-5140 | Protects hard disk and floppy disk, files and folders, System Folder, and applications; limits when computer can be used; offers screen locking, encryption, and secure erasure. |
| | ultraShield | ★★★/6.4 | $149 | 714/756-5140 | Protects hard disk and floppy disk, files and folders, System Folder, and applications; offers screen locking, encryption, and secure erasure. |
| ViaCrypt | ViaCrypt PGP 4.0 | ★/2.1 | $129 | 602/944-0773 | Encryption. |
| **NETWORK SECURITY** | | | | | |
| Atemi | NetShade 1.1 | ★★★★/8.1 | $299 (2 users), $1289 (10 users) | 217/352-3689 | AppleTalk encryption. |
| ELS | Mac Manager 3.1 | ★★★★/8.3 | $79 (single-user version), $299 (15 users) | 352/375-0558 | Protects hard disk and floppy disk, files and folders, System Folder, and applications; limits when computer can be used; offers screen locking, encryption. |
| Maxum Development | WebLock 1.0 | ★★★★/7.0 | $195 | 708/830-1113 | Uses AppleShare Users and Groups control panel. |
| Mr. Mac Software | Network Security Guard 3.1 | ★★★★/8.1 | $289 | 619/453-2845 | Scans for AppleTalk security oversights. |
| Network Systems | 8orderGuard Access Router | ★★★★/7.9 | $1700 | 612/424-4888 | Transparent encryption of AppleTalk and TCP/IP. |
| Quarterdeck | Editors' Choice<br>WebStar SSL 1.2.4 | ★★★★/8.5 | $1295 | 310/309-3700 | Transparent protection for Web-page data exchange. |
| Sassafras Software | KeyServer 4.1 | ★★★★/7.8 | $800 (10 users), $1350 (20 users) | 603/643-3351 | Automatic license management. |

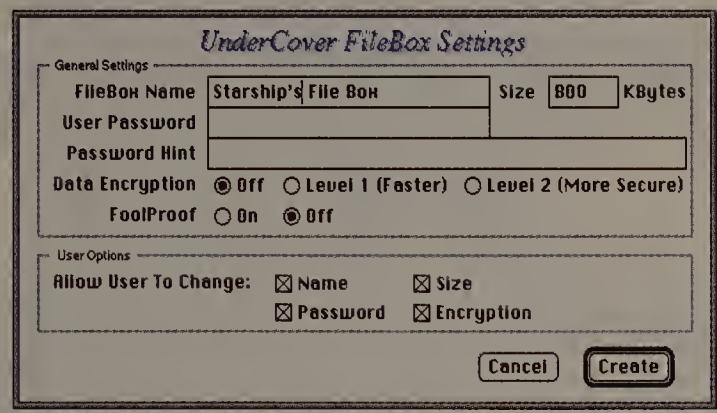
* *Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See* Star Ratings *section for full explanation.)*

vent of the Microsoft Word macro virus suddenly revealed the Macintosh's vulnerability to infections. A common symptom of Word macro viruses is the sudden inability to save your document as anything but a template.

I looked at the three retail virus detection products—Datawatch's (*http://www.datawatch.com*) Virex, Symantec's SAM (Symantec AntiVirus for Macintosh), and VirusScan from McAfee Associates (*http://www.mcafee.com*). Although these three have quite different interfaces, they all offer the same set of basic features: virus-detection updates, detection of Trojan horse and Word macro viruses, scheduled virus scans, and various forms of password protection.




**Easy Setup** Power On Software's On Guard uses tabs and a Finder-style interface to make a quick and easy job of putting limits on user access to your Mac.




**Make It Invisible** If you want to keep certain folders away from prying eyes, SmartStuff's UnderCover can create invisible drop boxes that can only be accessed with a password.

Both SAM and Virex come with a convenient installer that lets the software scan your hard drive for viruses even before installation. Both programs install reference files of previously scanned files. This allows the programs to check only for changes to your drive, thus speeding up performance. An initial scan may take several minutes, while subsequent scans take a few seconds.

In addition to those features, SAM can be set to call up Symantec's support BBS automatically to retrieve virus-detection updates. This is useful if you don't have access to an online service, where updates are routinely posted as soon as they're available. And Virex can be configured to automatically scan the files you've downloaded from the Internet or an online service.

Although only a beta version was available when this article was written, McAfee's VirusScan 2.0 looks to be a huge improvement over the previous version. VirusScan 1.0 (see *Reviews*, May 1996) was based on John Norstad's popular freeware, Disinfectant, and had little to recommend it over that. The new version offers a convenient installer wizard that asks you to specify the kind of virus protection you want and sets the preferences accordingly. An Expert mode lets you adjust settings manually.

VirusScan 2.0's performance also seemed reasonably quick (though not as fast as SAM's or Virex's). Then again, this was not the program's final release, so scanning speed may be tweaked further.

In terms of performance, SAM is a bit of a contradiction. Its system extension makes a number of programming calls to PowerPC routines with 680X0 code, which in theory should slow things down. But SAM didn't intrude on performance all that much. Since the program checks start-up files for viruses, your Mac may take 15 or 30 seconds more to boot, but otherwise the impact is slight. Your applications will open with just a very short delay. On the other hand, Virex does tend to cause things—such as typing speed in Word 6.0.1—to drag.

After we completed testing, S&S International (617/273-7400, *http://www.drsolomon.com*), best known for its Dr. Solomon's Anti-Virus Toolkit for the PC, announced a version for the Macintosh. The $85 utility has a couple of unique features that set it apart from the competition, including the acknowledgement that some Macintosh users, by virtue of mounting utilities and DOS-compatible cards, regularly insert PC-formatted floppies in their computers; hence it checks for PC viruses as well. In our spot check of the product (version 7.6.1 to match its PC counterpart), we found it ran more slowly than other programs (it's not PowerPC native), but it uses a modest amount of RAM.

## The Last Word

Overall, we were pleased with the caliber of the bolts and chains for the Macintosh. Top honors in our survey go to ASD Software's FileGuard. This program is easy to set up, runs reliably, and offers most of the security protection you need. Symantec's Norton DiskLock also gets good marks because it's so simple to configure, but it lacks a few of the security features offered by the competition.

Among the remaining programs, usrEZ Software's ultraSecure is practically a textbook of all the possible combinations of available Mac security protection. But it's hobbled by an awkward installation process, a dense manual, and many more cautions to the user than other products.

When it comes to virus software, Symantec's SAM does it better. McAfee's VirusScan 2.0 may also be worth a look; check out evaluation copies available for downloading from America Online and CompuServe.

And a final piece of advice: whatever program you choose, read the manual first. Some of these programs are quite complex, with a number of choices you'll want to consider in order to tailor protection for your work environment. You also want to pay special attention to the steps needed to remove the software in case something goes wrong. By following the manual (and its cautions, of course), you can be assured you have done the best you can to make your work environment as safe and secure as the state of the art will allow. **m**

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### SECURITY SOFTWARE

MW EDITORS' CHOICE

We tested Macintosh security software not only for the number of security features it offered, but also for ease of installation and use, both on the desktop and the network. As with any utility, a crucial facet was how much it intruded on the user's work.

**Desktop Security Software**

★★★★/8.0 **FileGuard 3.0** This software combines sophisticated protection, easy setup, and reliable operation, while imposing as few limits as possible on your Mac computing experience. **Company:** ASD Software (909/624-2594). **List price:** $139.

**Network Security Software**

★★★★/8.5 **WebStar SSL 1.2.4** For Web security, this lets you use transparent encryption to exchange sensitive data safely with popular SSL-capable Web browsers such as Netscape's Navigator and Microsoft's Internet Explorer. **Company:** Quarterdeck Software (310/309-3700, *http://www.quarterdeck.com*). **List price:** $1295.

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It's easy to access colors from within Adobe® Photoshop™, Illustrator®, QuarkXPress®, Macromedia FreeHand™ and more.

PANTONE® ColorDrive® web tools enable you to embed ColorSync/ICC profiles in GIF, TIFF and JPEG images.

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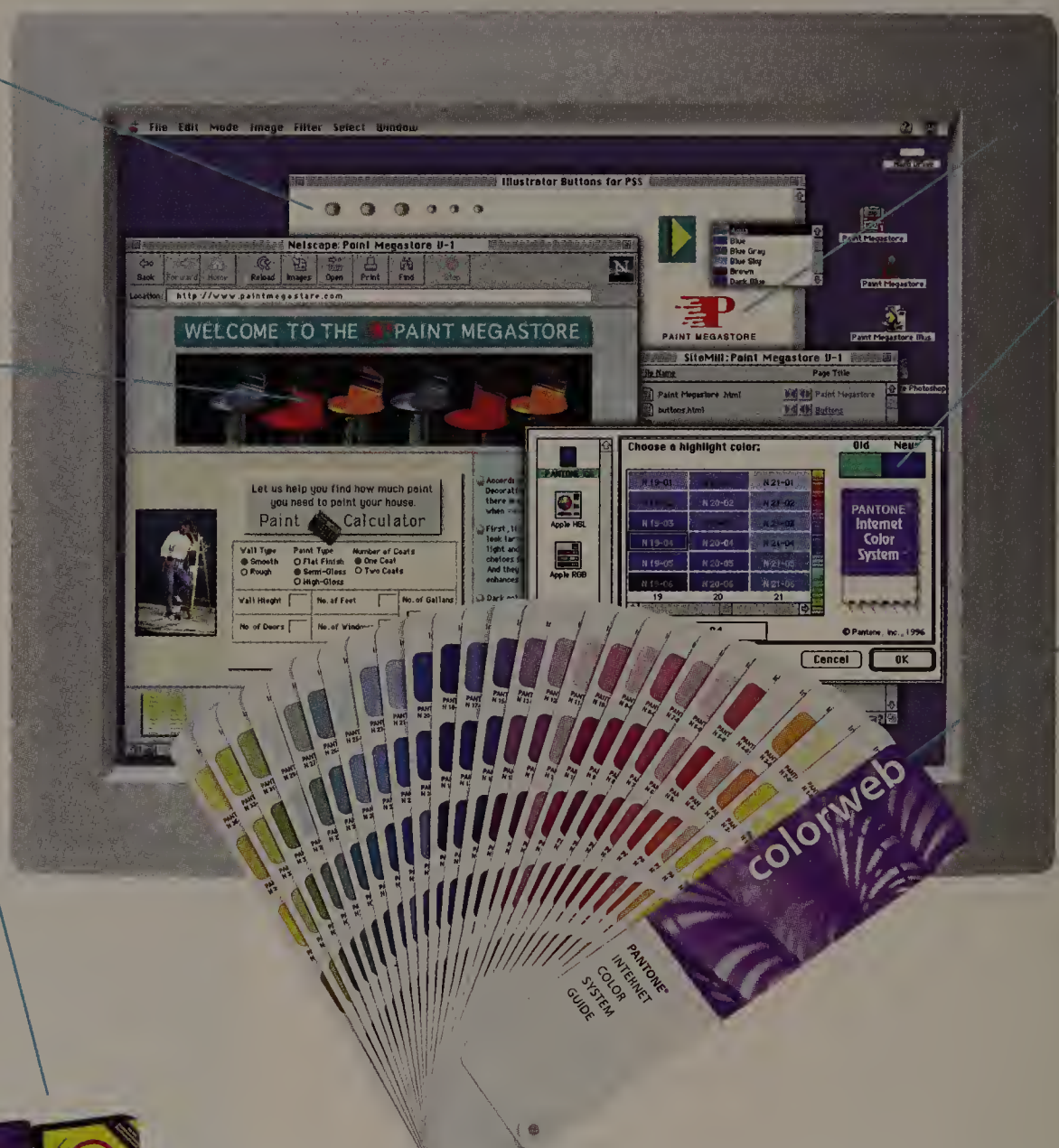
PANTONE ColorDrive now has enhanced features to ensure the most accurate color possible, no matter how it's reproduced.




Find the Internet color closest to your logo.

Select "Internet-safe" colors directly from within all popular Internet authoring programs. Then apply them to text, images, backgrounds and objects, using the PANTONE Internet Color Picker.

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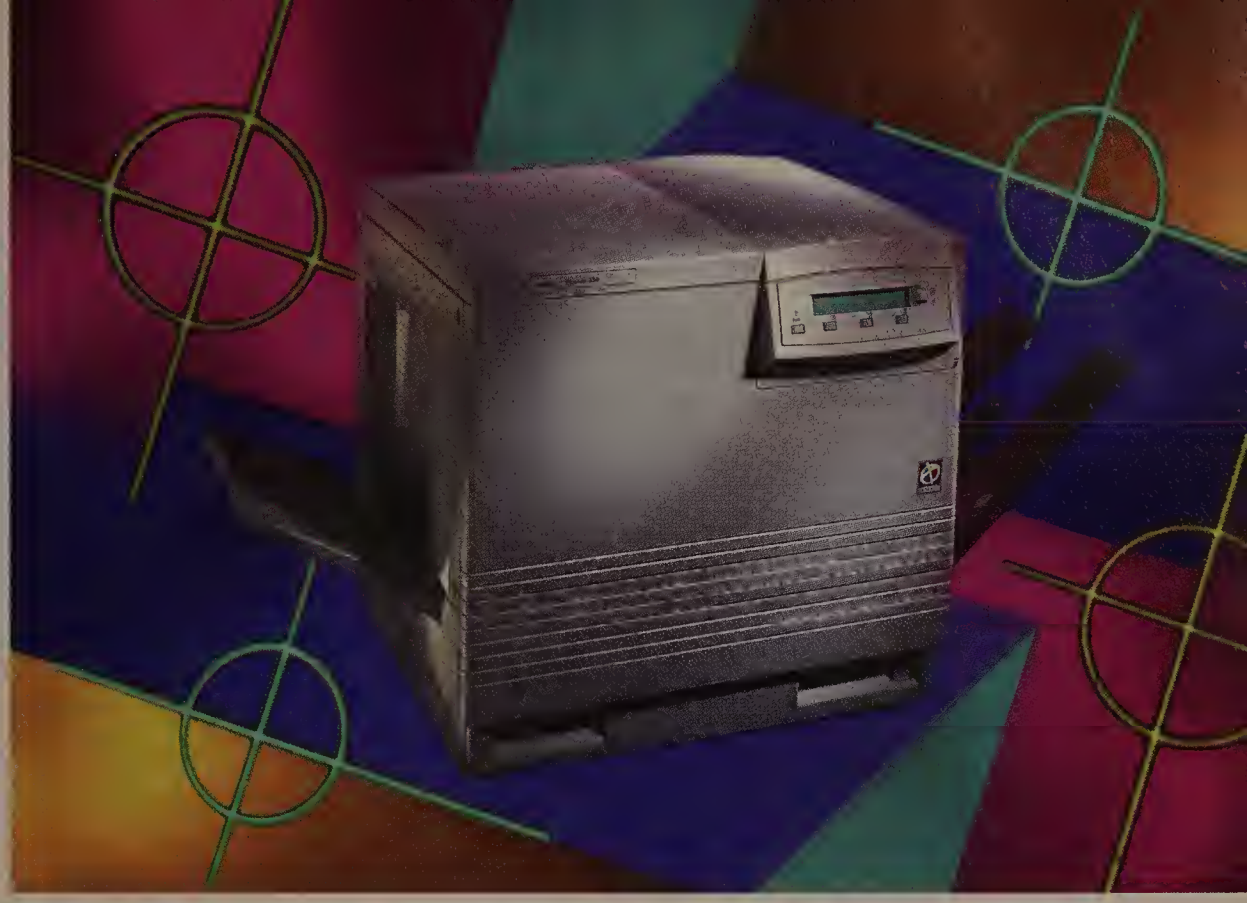
**Circle 14 on reader service card**

BY JOSEPH SCHORR

# Color Laser Values



## Macworld Lab Reveals Better Output and Lower Prices

WHEN THEY FIRST appeared a few years ago, color laser printers were an intriguing new technology—but with a number of hurdles to overcome. They were pricey (more than $9000) and difficult to set up. Consumables were expensive, too; output was slow; and the print quality was often disappointing.

A number of those problems persist with some models. But these days, there's good news on the color laser printer front. Prices have dropped—below $5000 in one case, the Xerox XPrint 4915 Plus (see the table, "Spotlight on Color Laser Printers"). There are more models than ever to choose from. And the technology has noticeably improved. While color lasers can't compete with dye sublimation for photo-realistic color, their output quality has come a long way.

We evaluated eight color laser printers to find the best among the current offerings. In our tests, we took a close look at output quality—after all, producing documents with rich, saturated, accurate color is ultimately what color printing is all about. We also considered speed. Because color laser printers must fuse four different kinds of toner to the page, print speeds can be slow, posing a problem for workgroups. Finally, we took into consideration each printer's ease of setup, hardware controls, consumables cost, and price.

### Who Needs Laser Color?

Color laser printers are still at least $3000 more than their monochrome counterparts. If you work in a small office or home office and need an inexpensive way to add color to your documents, you'd be better off with a color liquid ink-jet printer (see "Affordable Color Printers," *Macworld*, April 1996).

Color laser printers aren't meant to replace the dye-sub and thermal-wax printers used for high-end graphics, either. Not one of the models we evaluated, for example, could print tabloid or legal-size pages in color—a must for graphics professionals.

Ideally, color laser printers are for offices that need to print color business materials (letterhead pages, transparencies, presentation handouts, and the like), yet also need a high-quality monochrome workgroup printer. All the color laser printers we looked at have engines that can handle 10 to 14 pages per minute (in monochrome mode). In addition, they support Ethernet (an optional feature with some printers), multiple paper-tray handling, and PostScript Level 2.

### Color Lasers Compared

To judge image quality, we printed a variety of documents, including a full-page photo scanned into Adobe Photoshop and a complex PostScript file created in Adobe Illustrator. Then we assembled a panel of *Macworld* editors, art directors, and designers to rate the results (see

KEVIN CANDLAND

## Spotlight on Color Laser Printers

| Company | Product | Star Rating* | List Price/ Company's Estimated Price** | Phone | Maximum Resolution (in dpi) | Standard/ Maximum RAM |
|---|---|---|---|---|---|---|
| Apple Computer | Color LaserWriter 12/600 PS | ★★★/6.7 | NP/$6989 | 408/996-1010 | 600 | 12MB/40MB |
| Canon USA | Canon CLBP 360PS | ★★★/6.5 | $12,500/$10,000 | 516/328-5000 | 600 | 32MB/48MB |
| Hewlett-Packard | HP Color LaserJet 5M | ★★★/5.1 | $9195/$7395 | 408/246-4300 | 300*** | 36MB/92MB |
| Lexmark International | Optra C | ★★★★/7.0 | $6849/$6100 | 606/232-2000 | 600 | 8MB/64MB |
| QMS | magicolor CX/32 | ★★★/6.6 | $7999/NP | 334/633-4300 | 600 | 32MB/64MB |
| Tektronix | Editors' Choice Phaser 550 | ★★★★/7.6 | $6995/NP | 503/685-3067 | 1200 | 8MB/72MB |
| Xerox | Editors' Choice XPrint 4915 Plus | ★★★★/7.2 | $4995/$4500 | 716/442-4028 | 300*** | 16MB/48MB |
| | XPrint 4925 Plus | ★★★/6.9 | $8995/$8100 | 716/442-4028 | 600 | 24MB/48MB |

*NP = Not provided. * Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) ** Actual prices could be higher or*

**** 1200-dpi equivalent with resolution enhancement.*

the benchmark, "Beauty and Speed in One Package").

In the Photoshop test, the best-looking printouts (rated good but not excellent) came from the two Xerox (*http://www.xerox.com*) printers, the XPrint 4925 Plus and XPrint 4915 Plus. Both printers produced output with smooth color transitions, good skin tones, plenty of detail in shadowed areas, and rich color. The Lexmark International (*http://www.lexmark.com*) Optra C followed; its fairly good rendering of detail was offset by contrast problems and graininess.

The Canon (*http://www.canon.com*), Apple (*http://www.apple.com*), QMS (*http://www.qms.com*), and Tektronix (*http://www.tektronix.com*) printers garnered satisfactory but not exceptional ratings. The HP (*http://www.hp.com*) Color LaserJet 5M, however, brought up the rear; its Photoshop print samples were plagued with contrast problems and wildly inconsistent color.

In the Illustrator test, the ratings were generally lower overall, with most of the panel grading the output as unexceptional. The Xerox XPrint 4915 Plus produced bold, clear images, with minimal banding on gradient fills. Likewise, the Tektronix Phaser 550, with its 1200-dpi resolution, rendered some of the smoothest gradients and crispest lines, though some panelists felt the output appeared a bit dark and streaky.

At the bottom of the heap were the Apple, Lexmark, and HP printers. The Apple Color LaserWriter 12/600 PS displayed a number of weaknesses rendering PostScript graphics, completely misinterpreting some PostScript instructions and producing reversed gradients. The

## Beauty and Speed in One Package

If you're looking to buy a color laser printer for use as a workgroup printer, speed is as important as output quality. We used default or standard print-quality settings when testing color laser printers for speed. The printers that performed best in our quality evaluations—the Tektronix Phaser 550 and Xerox XPrint 4915 Plus—also stood out in our speed tests. On text-oriented jobs, however, the Lexmark and Apple printers were fastest.

Best result in test. Printers are shown in order of overall performance. All times are in seconds. Shorter bars are better.

| 600 dpi | Index | Photograph | Illustration | Long Single-Font Report | Short Multi-font Memo | Presentation Slide | Newsletter | Spreadsheet |
|---|---|---|---|---|---|---|---|---|
| Tektronix Phaser 550 | 1.00 | 260 | 122 | 189 | 99 | 59 | 184 | 119 |
| Lexmark Optra C | 0.96 | 336 | 506 | 129 | 77 | 64 | 125 | 124 |
| Canon CLBP 360PS | 0.92 | 374 | 125 | 374 | 88 | 73 | 163 | 96 |
| QMS magicolor CX/32 | 0.91 | 242 | 189 | 237 | 83 | 83 | 161 | 125 |
| Xerox XPrint 4925 Plus | 0.84 | 335 | 175 | 145 | 122 | 74 | 266 | 130 |
| Apple Color 12/600 PS | 0.68 | 372 | 565 | 141 | 91 | 126 | 287 | 194 |
| **300 dpi** | | | | | | | | |
| Xerox XPrint 4915 Plus | 0.94 | 275 | 142 | 147 | 115 | 68 | 253 | 109 |
| HP Color LaserJet 5M | 0.80 | 425 | 634 | 154 | 97 | 69 | 173 | 130 |

### Behind Our Tests

Color laser printers are expected to print a wide range of documents, from text only to full-color photographs to transparencies. Macworld Lab tested each printer's speed by printing a full-color photo scanned in Adobe Photoshop; an Adobe Illustrator–generated graphic; a 20-page Microsoft Word document with one font; a 2-page Word file with multiple fonts, sizes, and styles; a Microsoft PowerPoint overhead transparency; a four-page Adobe PageMaker newsletter with multiple fonts and PICT and EPS graphics; and a two-page Microsoft Excel spreadsheet. Macworld Lab ran all tests on a Power Mac 7100/80 running System 7.5.3 with 24MB of RAM and an internal 700MB hard drive. All printers were connected via the Ethernet port.

| Comments |
| --- |
| Slow speed, but excellent text output. |
| Good text output, but other results were mediocre. |
| Inferior output; slow; messy consumables. |
| Easy-to-use controls; good text and graphics output. |
| Unexceptional output. |
| Fastest printer; superior output; true 1200-dpi resolution. |
| Top-notch graphic output; a great value. |
| Graphics results among the best, but speed unimpressive. |

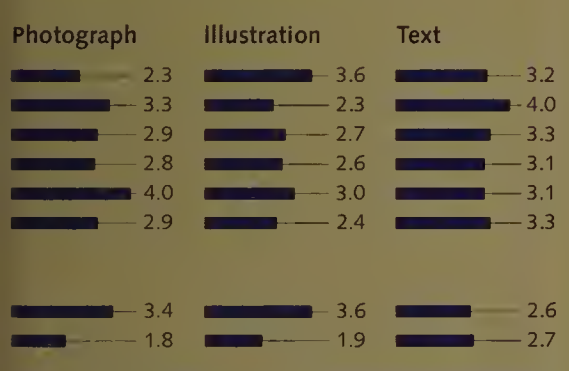
*lower than the estimated street price provided by the company.*

biggest complaint about the Lexmark Optra C was that its output appeared washed out. The HP Color LaserJet again finished last, with significant banding, flat color, and murky detail.

In our Microsoft Word test, which consisted of a color logo and several paragraphs of black type, there wasn't much variation among the printers. The Lexmark, Canon, and Apple models yielded the sharpest, cleanest type. The Xerox and Tektronix printers, which were favorites in the graphics-output tests, produced heavier type—not as crisp, but still quite acceptable. Again, the HP Color LaserJet scored low, this time due to noticeable toner spattering.

## Output Quality

We based ratings on printouts made at each printer's highest-quality setting, judging them on smooth color transitions; rich color; detail in shadows and highlights; and crisp, sharp images. No printer received an excellent score for image quality, or above-average ratings overall.




Each output sample—photo, illustration, and text—was scored on a scale from 0 (worst) to 5 (best). Neither the testing supervisors nor the judging panel knew which printer produced which output samples.—**Macworld Lab testing supervised by Mark Hurlow and Chris Uiterwijk**

### The Speed Factor

Happily, the printers that performed the best in our quality evaluations were usually among the fastest in our speed tests, too. The Tektronix Phaser 550 was the winner in our Illustrator tests, completing the job in just over 2 minutes, compared with the bottom-dwelling HP Color LaserJet, which finished at a slothful 10-plus minutes. On Photoshop files, the fastest printers were the Tektronix and the Xerox 4915, along with the QMS magicolor CX/32.

On text-oriented jobs, however, the Lexmark and Apple printers were among the fastest. The Optra C rendered a 20-page Word document nearly three times faster than the Canon—completing the job in just over 2 minutes—and almost 50 percent faster than the Phaser 550.

### Ease of Use, Maintenance, and Consumables

Print quality and speed are the key factors when choosing a color laser printer, but you should also consider hardware controls, maintenance ease, and the price of consumables.

The Tektronix and Lexmark printers both have well-designed control panels that let you configure printer options without hassle. The control panels on the Xerox machines have a more convoluted menu structure. The Canon controls feel cheap and flimsy, with tiny buttons, a control panel with a confusing menu, and poor construction. In fact, we inadvertently broke a latch off the output tray the first time we used it.

The Apple, Lexmark, and Canon printers get top marks for setup. With each of these printers, you add toner by sliding cylindrical toner cartridges (cyan, magenta, yellow, and black) into color-coded slots that make it impossible to insert the cartridges incorrectly. In contrast, setting up the Phaser 550 involves sliding in a large color-imaging kit, then another large photosensitive panel, in addition to the four toner cartridges. The HP is cursed with the worst setup of all: you have to empty bottles of toner into chambers one by one—the process is not only slow, but also presents serious spill potential. The LaserJet's clumsy setup process—not to mention its poor-quality output—is surprising, given HP's solid reputation in other printer categories.

The printers that generated the best-looking images in our output quality tests, the Xerox and Tektronix models, also required the most expensive consumables, including toner cartridges, toner developers, cleaning pads, fuser oils, and print drums, all of which must be installed and replaced regularly. Color toner cartridges cost anywhere from $43.95 (for the HP) to $269 each (for the Phaser 550)—and there are four of them in your printer that need replacement every 4000 to 8000 pages.

### The Last Word

Unfortunately, no single printer performed well in all categories. Overall, the Tektronix Phaser 550 emerged as the best of the bunch. The Phaser's image and text quality were highly rated; it's the fastest; and it's the only model we evaluated offering true 1200-by-1200-dpi resolution. And at $6995, it's less expensive than most of its competitors.

Also worthy of recommendation is the Xerox 4915 Plus—the least expensive printer we tested. The 4915 produced images of outstanding quality, handled tough PostScript jobs, and was reasonably fast. With a street price of about $4500, it's a great value, considering that its output was equal or superior to that of printers costing thousands more. **m**

Contributing editor JOSEPH SCHORR is the coauthor of *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide, 1996).

### COLOR LASER PRINTERS

We looked for the best combination of speed; output quality; and straightforward, easy-to-use design.

★★★★/7.6 **Phaser 550** The fastest printer we tested also happens to be the only one offering true 1200-dpi resolution. **Company:** Tektronix (503/685-3067, *http://www.tektronix.com*). **List price:** $6995.

★★★★/7.2 **XPrint 4915 Plus** Amazingly, this printer costs at least $1800 less than any of the other printers—yet its output consistently rated among the best. **Company:** Xerox (716/442-4028, *http://www.xerox.com*). **List price:** $4995.

# THE ULTIMATE MAC EVENT

## MACWORLD EXPO SAN FRANCISCO

MACWORLD Expo/San Francisco delivers an explosion of technology as the largest Macintosh-focused event on the West Coast. It's your opportunity to explore an exhibit floor with everything you've ever wondered about... ask an expert's opinion... compare and critique hot new products... or get the buzz on the latest from industry gurus. Whether you're already sold on the Mac or wondering which way to go, MACWORLD Expo/San Francisco is the ultimate event to plan your direction.

Fast-forward your productivity with maximum-impact conference sessions at MACWORLD Expo/San Francisco. You'll get the latest tips and techniques from leading experts on today's hottest topics including the Internet and World Wide Web, plus design, publishing, illustration, animation, audio/sound/music, graphics, entertainment, multimedia, connectivity, operating systems, education, telecommuting and small office/home office. MACWORLD Expo — it's unparalleled!

**REGISTER BY DECEMBER 2ND AND SAVE**

**SAN FRANCISCO**
**JANUARY**
**7-10, 1997**

# REGISTER NOW!

Register early and you'll not only ensure your spot at this can't-miss event, you'll also save on conference and exhibit fees. Return the attached registration form with your payment by December 2nd and save $25 on all conference sessions and exhibits ($170 now vs. $195 at the door). An Exhibits-only admission saves you $15 ($25 now vs. $40 cash only at the door). All early registrants, except international, receive their admission badge in advance. If your form with payment is not received by the pre-registration deadline of December 2, you will have to register on-site.

So rather than spending your time registering on-site, you'll be spending your time with the Macintosh experts!

***"Wonderful and exciting new developments. Really felt as though the speaker was sharing with us. Excellent, excellent, excellent!"***

# THE FUTURE-FOCUSED CONFERENCE PROGRAM

## What's New? What's Hot? What's Here? What's Coming?

In a word: PLENTY. Our blue-ribbon Conference Advisory Board has launched a stellar program brimming with intensive, content-rich new sessions, along with scintillating new speakers (and most-requested favorites).

Take a look at the dozens of enabling new applications from Apple and third-party developers… see why the Mac is the premiere vehicle for Internet access and creation of content for the World Wide Web… and spend four days with Macintosh mavens who will share their most successful tips on how to animate, navigate, publish, customize, and otherwise profit from your Mac!

For a future filled with power, productivity, and profitability, it's Mac to the future… at MACWORLD Expo.

*Seating at all conference sessions is on a space-available basis.*

## Here's a preview of the 11 separate conference tracks and individual sessions:

### A. The *Macworld Magazine* Track

*Macworld's editors, columnists, and featured guests present living pages of the magazine's hottest topics.*

• *Macworld Magazine's* Best of Show • The Best of *Macworld* MacSECRETS • Choosing the Best Mac for Your Needs • Illustrator/Freehand/Canvas/CorelDraw Shootout! • Maximizing the New PowerBooks • Multimedia Secrets

### B. The Design/Art/Prepress Track

*Celebrated artist, illustrators, designers, and graphics gurus share intensely useful tips, tricks, and technology breakthroughs.*

• Desktop Color Scanning • Kai's Killer Tips and Tricks • Digital Photography • Illustrator WOW! Artists • Painter WOW! Artists • Photoshop WOW! Artists • Advanced Imaging for Professionals • The Stages of a Graphic Masterpiece

### C. The Web Creativity/Web Masters Track

*Get a leg up on the Web (and your competition) with sessions designed to help you cruise, serve, and populate the Net. Give your business the Macintosh/Web Advantage!*

• Choosing a Web Server • CGI and Database Tools Overview • Server Administration • Webcasting • New and Future Internet Technologies • Cool Web Server Tools • Building Interactivity Into Your Web Site • Publishing on the Web • Designing Graphics for the World Wide Web • Web Page Navigation and Content Structure

### D. The Operating System/Connectivity Track

*Learn how to maximize the Mac with the bonuses Apple threw in for free -- to upgrade your Mac so that it'll continue to perform at peak, and connect to even more powerful networks.*

• Essential Network Management Tools • Apple Extensions Explained • Apple OS Update • TCP/IP Report • Clones: A User Perspective • Stump the Network Experts! • Connect Anywhere Networking (Wireless/Mobile Computing) • Dealing with OpenDoc and Cyberdog

### E. The Creating Entertainment Track

*For design, video, film and multimedia professionals: the increasing power of the Mac, coupled with the global reach of the Web, offer unparalleled opportunities for entertainment creation. Learn from the pros and have fun while you're doing it!*

• QuickTime VR • Career Opportunities for Digital Media Artists • Audio, Sound, and Music Tools • Developing Interactive Games • Case Study: On-Air Graphics • New Worlds of Expression with Digital Video • The Mac in Cinema • Creating Multimedia Content for Online and CD-ROM • 3D Animation: Step by Step

### F. The Getting-Started Track

*Practical, focused, step-by-step approaches and guidelines for those who need a concentrated course of beginner's how-to's on Mac technologies and techniques.*

• Online Survival Guide • Beginner's Guide to the Internet • Beginner's Guide to Publishing a CD-ROM • Intermediate Internet • Getting Started with QuickTime • Getting Started with HTML • Getting Started with Java

### G. The Telecommuting & Home Office Track

*Never before has it been easier -- or more fun! -- to launch a small company or home-based business. Discover the cost savings and increased productivity that can be achieved by telecommuting, as millions of Macintosh users are now doing. Hear experts share their insights on how YOU can make it happen too.*

• Introduction to Telecommuting • The Joy of Working from Home • Marketing with Your Mac • SOHO on the Internet • Using the Latest and Greatest to Run Your Small Business • Small Business Success Secrets

### H. The Tools Workshops

*Intensive training sessions on some of the most popular Macintosh tools, presented in a totally non-biased format by the award-winning staff of MacAcademy.*

• Mastering the Macintosh • Claris Works • Adobe PageMill • Adobe Photoshop • QuarkXPress • Adobe Illustrator • Macromedia Director

### I. The Educator's Track

*An excellent opportunity for educators, administrators, and students to show and be shown new and classic examples of how the Macintosh positively shines as a teaching tool.*

• Maximizing the Mac in Education • QuickTime for Educators • Multimedia for Educators • The Internet for Educators • The Macintosh Student Showcase • Webcasting for Classrooms

### J. The Special Interest Group Track

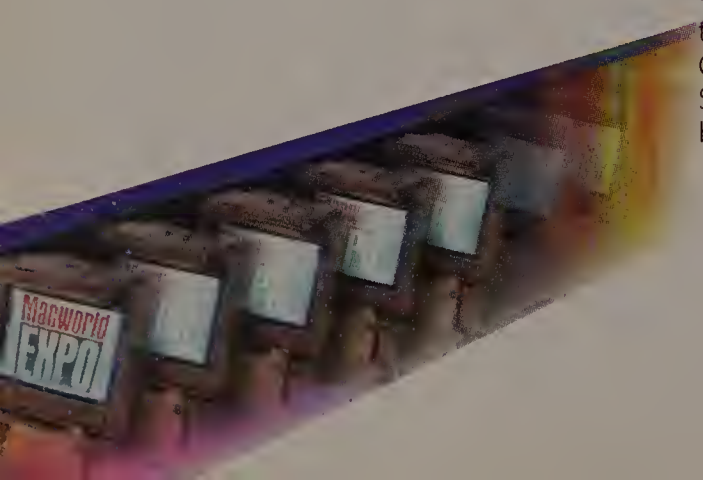
*Sessions for "birds of a feather" looking to compare Mac notes with others in a similar setting – to solve special problems, to see how colleagues across the continent are getting more mileage out of the Mac, and to develop an invaluable "user network."*

• Macs in the Law Office • Macs in Science and Technology • User Group Academy Presents: The Mac and Your Non-Profit

### K. The You-Asked-For-It-Track

*A combination of perennial MACWORLD Expo favorites, plus brand-new topics in response to your special requests, with up-to-the-minute market developments. For starters:*

• Customizing Your Mac • Internet Security • Resolving System Conflicts • Cross-Platform Development • JavaScript Tips and Tricks • Intranet Insights • Newton: What Can it Do Today?



# SPECIAL FEATURES

## The Keynote Sessions

There will always be a Macintosh in your future! The dynamic keynotes at MACWORLD Expo/San Francisco will catapult you closer to the excitement of tomorrow's promise — while putting you in touch with the next wave of Mac technologies. More dazzling session announcements to come — but meanwhile, here's just one sneak peek:

**Macintosh Coooool:**
**The Hottest, Coolest, Baddest New Apps for the Mac**
Join Apple Fellow and Ultimate MAC Evangelist **Guy Kawasaki** for a close-up look at some of the most exciting new applications to hit the Macintosh market. Guy has personally picked a panel of companies whose products have impressed him as hottest, coolest, and/or baddest — and they're ready to deliver not only a session that will spellbind, but also a glimpse of how the future holds ever more power and productivity for your Macintosh!
**Keynotes:** Tuesday, January 7 • San Francisco Marriott Hotel

## The Net Zone

The future of online communications is here! Enter the Net Zone and come in contact with the latest in Internet hardware/software; security and encryption; Intranet applications; cutting-edge demos; e-mail technologies; and more. Don't miss out on this opportunity to explore, sample and learn more about the world of the Internet.

MACWORLD Expo has built an extensive Conference Program featuring a multitude of sessions specific to the Internet. Fasten your seatbelt and learn how to maneuver along the superhighway!

## The Pavilions: Gateways of Discovery

**Developer Greenhouse:** This pavilion is a hothouse of ideas featuring the future of Macintosh software, including products for the Internet, OpenDoc and Entertainment.
**Business Solution Pavilion:** Explore the future of business management software products and solutions.
**Education Pavilion:** Sample new software and multimedia applications for every curriculum area.

## UGWUMP

(User Group Welcoming/Unwinding/Meeting Place)
Exchange ideas and stories at this one-of-a-kind networking parlor for user groups. Swap newsletters, literature; learn how to start a user group in your area, and more!

## MacSciTech Resource Center

Come and discuss with engineers and scientists the changes and issues dealing with how the Macintosh plays a role in chemistry, biology, computer science, design/test engineering, physics, mathematics, and more!

## Developer Central

Developing applications or custom solutions? Then don't miss out on this opportunity to find the latest tools and training solutions for Macintosh and Newton development.
Attend seminars taught by the world's best Mac techies!

**For more information call 800-645-EXPO or see http://www.mha.com/macworldexpo**

# MACWORLD EXPO/SAN FRANCISCO REGISTRATION FORM

**MACWORLD Expo/San Francisco • January 7-10, 1997 • Moscone Center**

## 1. REGISTRATION SELECTION AND FEES

❑ **Package One $170**
Conference Sessions, Exhibits and Keynote Sessions.
Pre-register by December 2nd ($195 at the door).

❑ **Package Two $25**
Admission to Exhibits only.
Pre-register by December 2nd ($40 cash only at the door).

❑ **Check if Applicable**
I'm an international attendee. Please mail my badge by Federal Express. Enclosed is an additional U.S. $45.

❑ **Check if Applicable**
If you are disabled and require special services, please attach a written description of your needs.

## Pre-Register by December 2nd and Save!

Please choose your package and fill out the form completely. Incomplete forms will be returned. One form per person; make photocopies for additional people. **Payment must accompany form for registration to be complete.** Purchase orders not accepted. **Registration forms received after December 2nd will be returned unprocessed.** This form cannot be used for on-site registration. **All registration fees are non-refundable and credentials are non-transferable.** A $20 fee will be charged for all returned checks. Confirmation of your registration will be sent to you once registration is received.
**U.S. Badges:** will be mailed on or about December 18.
**International Badges:** (including Canadian) will be held on-site at the International Badge Pick-up Counter in the North Lobby of the Moscone Center during registration hours.
**Registration Hours:** January 6, 11:00 a.m. - 4:00 p.m.; January 7-9, 9:00 a.m. - 6:00 p.m.; January 10 9:00 a.m. - 4:00 p.m.

## 2. CUSTOMER INFORMATION

**MWP**

Please check one: ❑ Home Address ❑ Company Address

**FIRST NAME** **M.I.** **LAST NAME**

**TITLE**

**COMPANY**

**STREET ADDRESS** **(Please Include Apt. #, Suite, Mail Stop, etc.)**

**P.O. BOX** **(If Applicable)**

**CITY** **STATE/PROVINCE** **ZIP CODE/POSTAL CODE**

**COUNTRY**

**TELEPHONE** **EXTENSION**

**FAX** **INTERNET/EMAIL ADDRESS**

## 3. ATTENDEE PROFILE

WHAT IS YOUR INDUSTRY? (Check One Only)
❑ 1. Accounting/Finance
❑ 2. Aerospace
❑ 3. Architecture/Construction/Process Industries
❑ 4. Art/Design/Creative Services
❑ 5. Arts & Entertainment
❑ 6. Computer Reseller/VAR/VAD/Service
❑ 7. Consulting
❑ 8. Education
❑ 9. Engineering/R&D
❑ 10. Government/Military
❑ 11. Health/Medical Services
❑ 12. Legal Services
❑ 13. Manufacturing (Computer Industry)
❑ 14. Manufacturing (Non-Computer Industry)
❑ 15. Marketing/Sales/PR/Communications
❑ 16. Printing/Publishing
❑ 17. Transportation
❑ 18. Utilities
❑ 19. Other_____

WHAT IS YOUR JOB FUNCTION? (Check One Only)
❑ 20. Art Director/Graphics
❑ 21. Consultant
❑ 22. Controller/Treasurer/Accounting/CFO
❑ 23. Corporate Executive
❑ 24. DP/IS Management/CIO
❑ 25. Editorial/Writing
❑ 26. Educator
❑ 27. Engineering/Scientific/R&D
❑ 28. Human Resources
❑ 29. Management/Department Head
❑ 30. Marketing/Sales
❑ 31. Network Management
❑ 32. Professional (Lawyer, Doctor, etc.)
❑ 33. Programming/Analysis
❑ 34. Purchasing
❑ 35. Training
❑ 36. Other_____

WHAT IS THE SIZE OF YOUR ORGANIZATION?
❑ 37. Under 50
❑ 38. 50-99
❑ 39. 100-499
❑ 40. 500-999
❑ 41. 1000 & Over

WHICH PERSONAL COMPUTERS DO YOU USE? (Check all that apply)
❑ 42. Macintosh Powerbook Series/Duo Series
❑ 43. Macintosh II Series
❑ 44. Macintosh Performa Series
❑ 45. Macintosh Centris Series
❑ 46. Macintosh Quadra Series
❑ 47. Macintosh Workgroup Series
❑ 48. PowerMac
❑ 49. Newton
❑ 50. Mac clone
❑ 51. IBM PC or compatible desktop
❑ 52. IBM Laptop/Notebook
❑ 53. Other_____

HOW MANY MACINTOSH COMPUTERS ARE USED IN YOUR ORGANIZATION?
❑ 54. 0
❑ 55. 1-10
❑ 56. 11-25
❑ 57. 26-50
❑ 58. 51-100
❑ 59. 101-500
❑ 60. 501+

ARE THE COMPUTERS AT YOUR ORGANIZATION NETWORKED?
❑ 61.Yes
❑ 62. No

WHICH APPLICATIONS DO YOU OR YOUR ORGANIZATION UTILIZE? (Check all that apply)
❑ 63. Accounting/Finance
❑ 64. Agenda Minder/Scheduler
❑ 65. CAD/CAM
❑ 66. CASE Tools
❑ 67. Database
❑ 68. Desktop Publishing
❑ 69. Digital Video
❑ 70. Education
❑ 71. Graphics
❑ 72. Multimedia
❑ 73. Project Management
❑ 74. Speadsheet
❑ 75. Word Processing

WHICH (IF ANY) OF THESE SERVICES DOES YOUR ORGANIZATION UTILIZE? (Check all that apply)
❑ 76. America OnLine
❑ 77. AT&T
❑ 78. CompuServe
❑ 79. Netscape
❑ 80. Prodigy
❑ 81. Other_____

## 4. PAYMENT METHOD

❑ Check enclosed (make payable to MACWORLD Expo)
❑ Master Card ❑ Visa ❑ American Express **AMOUNT $** _____

**ACCOUNT NUMBER**

**EXPIRATION DATE** **CARD HOLDER SIGNATURE** (Signature necessary to be valid)

X_____

If card holder is other than registrant, please print card holder's name below:
**FIRST NAME** **M.I.**

**LAST NAME**

**Payment must accompany form for registration to be complete. Purchase orders not accepted.**

## REGISTER NOW!

**Mail to: MACWORLD Expo/San Francisco**
**P.O. Box 9103, Norwood, MA 02062-9103**
**or**

**Fax: 617.440.0359**
**(Fax registration forms must include credit card information)**
**Call 800-645-EXPO for more information.**

(TTY) Service is available for the hearing impaired. Dial (617) 440-0366.

## IMPORTANT

**Don't pay twice for this event! If you fax your registration please do not mail it in as well; you will be double billed.**

# TRAVEL & ACCOMODATIONS

Call Event Travel Services, the official travel agency for MACWORLD Expo, at 800-361-8191, 9:00 a.m. – 7:00 p.m EST or fax ETS at 617-361-6936 to make all your travel arrangements.

ETS has obtained exclusive discounted rates from major airline, hotel and car rental agencies, just for you! These special rates are only available by contacting Event Travel Services, the official travel agency for MACWORLD Expo. Event Travel Services is ready to help with all your travel plans for this exciting event.

### Accommodation Restrictions

Hotel availability is limited and on a first-come, first-served basis. A credit card number with one night's non-refundable deposit is required when making your reservation. Hotel rates and availability are subject to change.

### Cancellation Policy: Airline/Hotel/Car Rental

All changes should be made through Event Travel Services no later than 3 days prior to arrival. Cancellation policies vary according to hotel.

Responsibility and Liability: Event Travel Services, travel program producer, and MHA Event Management, travel program sponsor, and/or their agents act only in the capacity of agents for customers in all matters pertaining to hotel accommodations and transportation whether railroad, motor car, airplane or any other means, and as such are not responsible for any damage, expense or inconvenience caused by late train or plane arrivals or departures, or by any change in schedule or condition from any loss, injury or damage to any person or property from any cause whatsoever. Baggage handling throughout the program is entirely at the owner's risk. The customer agrees that MHA Event Management/Event Travel Services shall not be held responsible in the event of any errors or omissions in any promotional material.

### Services for the Physically Challenged

We're committed to ensuring that our physically challenged attendees receive all the services they need to make their visit productive. Call us at 800-945-3313 for more details on the services we offer.

| Hotel | Single/Double |
|---|---|
| **ANA Hotel**<br>50 Third St., San Francisco, CA 94103 | $159/179 |
| **Best Western Americania**<br>121 Seventh St., San Francisco, CA 94103 | $77/87 |
| **Crowne Plaza Parc Fifty Five Hotel**<br>55 Cyril Magnin St., San Francisco, CA 94102 | $130/140 |
| **Fairmont Hotel**<br>950 Mason St., San Francisco, CA 94108 | $99/99 |
| **Grand Hyatt San Francisco**<br>345 Stockton St., San Francisco, CA 94108 | $145/145 |
| **Holiday Inn Civic Center**<br>50 Eighth St., San Francisco, CA 94103 | $105/105 |
| **Holiday Inn Golden Gateway**<br>1500 Van Ness Ave., San Francisco, CA 94109 | $95/105 |
| **Holiday Inn Union Square**<br>480 Sutter St., San Francisco, CA 94108 | $130/140 |
| **Hotel Britton**<br>112 Seventh St., San Francisco, CA 94103 | $58/68 |
| **Hotel Nikko**<br>222 Mason St., San Francisco, CA 94102 | $140/140 |
| **Hyatt Regency San Francisco**<br>5 Embarcadero Center, San Francisco, CA 94111 | $149/169 |
| **King George Hotel**<br>334 Mason St., San Francisco, CA 94102 | $109/119 |
| **Mark Hopkins Inter-Continental**<br>Number One Nob Hill, San Francisco, CA 94108 | $125/125 |
| **Ramada Plaza Hotel at Fisherman's Wharf**<br>590 Bay St., San Francisco, CA 94133 | $104/104 |
| **Renaissance Stanford Court Hotel**<br>905 California St., San Francisco, CA 94108 | $139/149 |
| **San Francisco Hilton and Towers**<br>333 O'Farrell St., San Francisco, CA 94102 | $153/173 |
| **San Francisco Marriott**<br>55 Fourth St., San Francisco, CA 94103 | $174/196 |
| **Sheraton Palace Hotel**<br>2 New Montgomery St., San Francisco, CA 94105 | $165/185 |
| **Sir Francis Drake Hotel**<br>450 Powell St., San Francisco, CA 94102 | $130/140 |
| **The Westin St. Francis**<br>335 Powell St., San Francisco, CA 94102 | $154/174 |

**MACWORLD Expo/**
**San Francisco**
**Moscone Center**
**January 7–10, 1997**

**REGISTRATION HOURS**
**Early Bird Registration:**
**January 6, 11:00 a.m. - 4:00 p.m.**
**January 7-9, 9:00 a.m. - 6:00 p.m.**
**January 10, 9:00 a.m. - 4:00 p.m.**

**EXHIBIT HOURS**
**January 7-9: 10:00 a.m. – 6:00 p.m.**
**January 10: 10:00 a.m. – 4:00 p.m.**

**CONFERENCE HOURS**
**January 7: 1:00 p.m. – 5:15 p.m.**
**January 8-9: 11:30 a.m. – 5:15 p.m.**
**January 10: 11:30 a.m. – 2:15 p.m.**

**KEYNOTE** (open to conference attendees only)
**January 7: Yerba Buena Ballroom,**
**San Francisco Marriott**

**For more information call 800-645-EXPO or access http://www.mha.com/macworldexpo**

## THE VISTA-S6E SCANN

**THE CHOICE OF EXPERTS:**

"You should consider the UMAX scanner's good software and low price before settling on one of the others."

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**FEATURES**

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- Maximum dpi of 4800—highest in its cla
- Exclusive AutoScan feature for easy ope
- Kodak Color Management System® opti to work with printers like HP and Cano
- Unlimited, toll-free technical support

# THE VISTA-S6E MAKES SCANNING AS EASY AS 1-2-3, 1-2-3.

Presenting the Vista-S6E multi-purpose color scanner from UMAX. It takes all the fancy footwork out of scanning images to your computer. Which means you can instantly enjoy the benefits of a high-speed, professional-quality flatbed scanner–even if you're a novice. And it's unbelievably affordable, loaded with more features and software options than any scanner in its class. Like Adobe PhotoDeluxe™ application software. Presto! PageManager™, which automatically manages scanning functions like faxing, OCR and Internet publishing. AutoScan, for guaranteed ease-of-use. Or Adobe PhotoShop®, for image editing and manipulation. All you have to do is determine which image will bring that magic touch to your presentations, brochures, data-sheets—even internet homepages. Then let the Vista-S6E take the lead.

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# Secrets

# Keep Your Hands Off My Mac

SECURITY MEASURES THAT WILL KEEP YOUR SECRETS SECRET

by Joseph Schorr

This column is about *real* secrets—not obscure keyboard shortcuts or hidden software features, but stuff you want to keep away from prying eyes, like your Visa card number or that diatribe about your boss that was meant for your eyes only. Haven't you stored information on your Mac that you'd rather not share with your coworkers? Then it's time to implement a little Mac security. These free techniques won't stop hard-core hackers, but they'll definitely discourage casual snoops.

### Make It Invisible

It's easy to make a file or folder invisible using any incarnation of System 7. First copy a swatch of plain white space to the Clipboard. You can do this in any graphics program; or by opening the Desktop Patterns control panel, switching to plain white, and choosing Copy (⌘-C). Next, select the file you want to make invisible and choose Get Info (⌘-I) from the File menu. Click on the file's icon in the Get Info window and choose Paste (⌘-P). Replace the file's name with blank spaces. The file is now invisible in the Finder's icon views, though not in list views. You can still select the file (by dragging over it) and open it—if you know where it is.

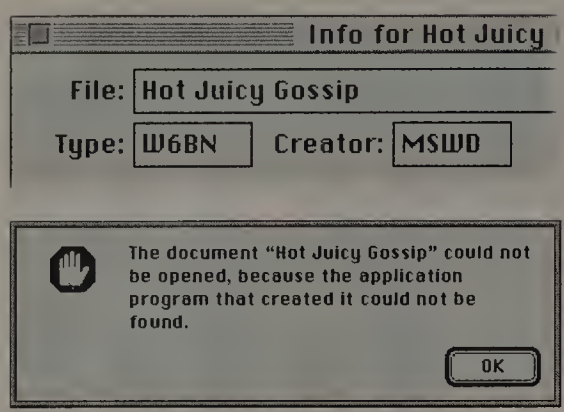
### Make It Unopenable

Even if people stumble upon one of your files, it will do them little good if they can't open it. You can lock a file by changing its Type and Creator codes. You'll need some kind of file utility, such as ResEdit, DiskTop ($69.95; Prairie Group; 515/225-3720, *http://members.aol.com/prairiesft/*) or Laurence Harris's shareware program File Buddy (available from Macworld Online). Here's how to use ResEdit to lock a Microsoft Word document.

Launch ResEdit and choose the Get File/Folder Info command to select a Word file. In the Info window, you'll see the file's Type code (W6BN) and its Creator code (MSWD). Change the codes and the Mac has no idea what kind of file this is and what program opens it.

You can change each code to any four-character string you want, but it's easiest to change uppercase characters to lowercase and vice versa—that adequately confuses the Mac. Now save and close the file. Double-click on the altered file, and you'll get an error message. Even Word won't recognize the file. To unlock the file, restore the original codes.

*continues*




**A File That Refuses to Open** Changing a Word file's four-letter Type and Creator codes via the Get File/Folder Info command in ResEdit (top) yields an unopenable document that produces the error message shown here (bottom).

### Disguise It

Here's a devious variation: disguise your document as a different kind of file. For example, if you change a file's Type code to INIT, your file—be it a Word document, Claris FileMaker database, Microsoft Excel spreadsheet, or whatever—appears in the Finder as a genuine system extension. It has the usual jigsaw-puzzle icon; double-clicking on it brings up a dialog box telling you to place the file in the Extensions folder and restart.

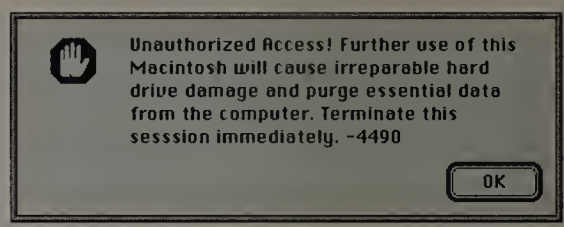
To complete the disguise, rename the file something like AppLibTPC Enabler and put it in your Extensions folder. Who'd suspect that confidential files are pretending to be part of the Mac OS?

### Hands Off

The best way to deter snoops is to keep them from pawing around on your Mac in the first place. Try these tricks.

Use ResEdit to create a threatening start-up message. Make a copy of System 7.5's WindowShade Preferences file (it's in the Preferences folder in the System Folder) and open the copy with ResEdit. Double-click on the STR icon and then open STR resource -16397—the only one listed. In the field called The String is an error message that clicking on this file normally generates. Replace this text with your own message. Make it scary.

When you're done, save the doctored file and place it in the Startup Items folder. Finally, if you're using System 7.5 or later, turn off Macintosh Easy Open. An unsuspecting soul who starts up your Mac will be confronted with a very intimidating message—and might be spooked enough to shut down ASAP.




**Sheer Intimidation** A really intimidating warning makes intruders think twice about rooting around in your hard drive.

You can simply dismiss the bogus warning when you start up—or avoid it completely by holding down the shift key as soon as the Mac desktop appears (which allows extensions to load normally, but bypasses the Startup Items folder).

### Turn It On, Turn It Off

Another start-up strategy: Drop a copy of System 7.5's •ShutDown desk accessory (in the Apple Menu Items folder) into the Startup Items folder. When an intruder tries to start up, your Mac simply shuts itself off. Again, bypass Startup Items by holding down the shift key during start-up.

### Plant a Few Mines

Make a bunch of duplicate copies of the •ShutDown desk accessory. Rename the copies and change their icons so that they look like other types of files. (To copy a file's icon, select the file, choose Get Info from the File menu, click on the icon in the Get Info window, and choose Copy. To paste the icon onto another file, select the file, choose Get Info from the File menu, click on the icon in the Get Info window, and use the Paste command.)

Plant these files all over your Mac. Make them alluring: call one My Hard Drive and give it your hard drive's icon, then drag it into the upper right corner of your desktop. Call another one My 1996 Income and paste an Excel spreadsheet icon on it. (Or try the surefire Confidential.) Every one of these files when double-clicked will shut down your Mac, driving a nosy intruder crazy. Believe me, these little traps really work if you make them convincing-looking: I inadvertently shut down my own Mac no less than a dozen times while writing this column!

Of course, such tricks aren't fail-safe security software. If you're looking to foil a serious intruder, check out "Secure Your Mac," elsewhere in this issue. **m**

Contributing editor JOSEPH SCHORR is coauthor of *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide, 1996).

## THE MACINTOSH SECRET DECODER RING

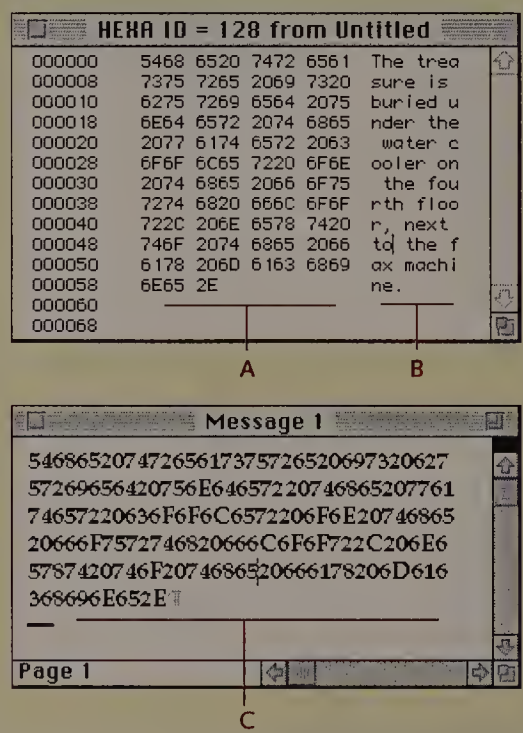
WANT TO SEND A REALLY SECRET MESSAGE TO SOMEONE? USE RESEDIT TO TRANSLATE A MESSAGE INTO RAW HEXADECIMAL CODE—MAKING IT IMPOSSIBLE TO READ WITHOUT DECODING IT FIRST.

To encode a message, launch ResEdit and use the New command (⌘-N) to create a new file. Choose the Create New Resource command from the Resource menu and select HEXA in the Select New Type dialog box. This will open a new hex edit window.

Click in the rightmost portion of the window **(B)** and start typing your message. As you type, you'll see the corresponding hexadecimal code fill in the center four columns of the hex editor **(A)**.

When you've typed your complete message, click once anywhere within the columns of code, choose Select All (⌘-A) from the Edit menu, and then use the Copy command. Paste the text that you've copied into a word processor or E-mail document. You'll end up with a long, apparently meaningless string of numbers and letters **(C)**.

To decode the message, copy the code to the Clipboard, launch ResEdit, then paste the string of characters into an empty hex-editor window (either in an existing file or in a new ResEdit document). The message will instantly appear in the ASCII column on the right side of the hex editor.



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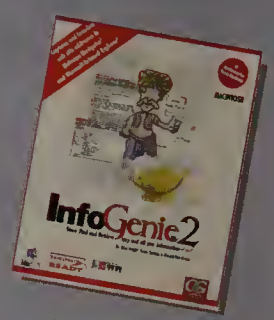


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# Quick Tips

## Tips, Tricks, and Shortcuts

by Lon Poole

*¡Caramba!* You have just a few pages to print when the jets on your Apple StyleWriter's ink cartridge begin to plug up, causing white streaks in the printer's output. The StyleWriter Print dialog's "Clean ink cartridge before printing" option doesn't help, and there's not a replacement cartridge in sight. What to do? Dan Coventon of San Pedro Sula, Honduras, has rescued several cartridges with this trick: Remove the cartridge; then wet a cotton swab with pure isopropyl alcohol and very gently swab the surface of the print head. You may have to repeat this a couple of times to get the cartridge to print like new. While you're at it, why not take the time for further printer maintenance? Use a dry swab to soak up some of the ink in the sponge that caps off the print head when it's parked at the right side of the printer.

Since going over the print head with a cotton swab could conceivably damage the print head, you may want to first check for lint around the sponge or the clear plastic wiper near it, and wipe off any accumulated lint with your finger. The lint may absorb ink and cause white streaks in the output just like an ink-clogged cartridge. If removing lint doesn't eliminate the streaks, you have little to lose by swabbing the already malfunctioning print head.

### TrackPad Insanity

**Q** Please help me—I have been driven insane. Every time I touch the TrackPad of my PowerBook 190cs, the cursor jumps like a horse. My friends have no problem using my PowerBook's TrackPad. I think the problem is that I sweat too much. At the moment, I am using my lab glove to operate my PowerBook. Help!

KA TAI SHIU
*Vancouver, British Columbia, Canada*

**A** According to Apple, sweaty hands or moisture on the pad can cause the pointer to move erratically. Oil or lotion can cause the same problem. Wipe off the pad with a soft cloth or tissue, and try using the pad with a piece of paper between your finger and the pad. If the problem persists, try removing the TrackPad preferences file (a new one will be created automatically). Also, try removing rings and bracelets; jewelry can interfere with TrackPad performance.

If the problem goes away with a piece of paper between your finger and the pad, Apple suggests you purchase a plastic membrane to fit over the pad; this will prevent moisture from directly contacting it. Before installing the membrane, clean the pad with a mild glass cleaner, spraying it on the cleaning cloth, not directly on the pad. One source of TrackPad membranes is APS Technologies (800/874-1341, *http://www.apstech.com*), which sells a sheet of 20 decorative, removable Mylar "skins" for $4.95 (item number 105289).

*Macworld* contributing editor and PowerBook specialist Cary Lu suggests plugging in a mouse when you are working at a desk. For travel, try turning your hand and using a knuckle. The knuckle method may well become tiresome, but it suffices for short-term work.

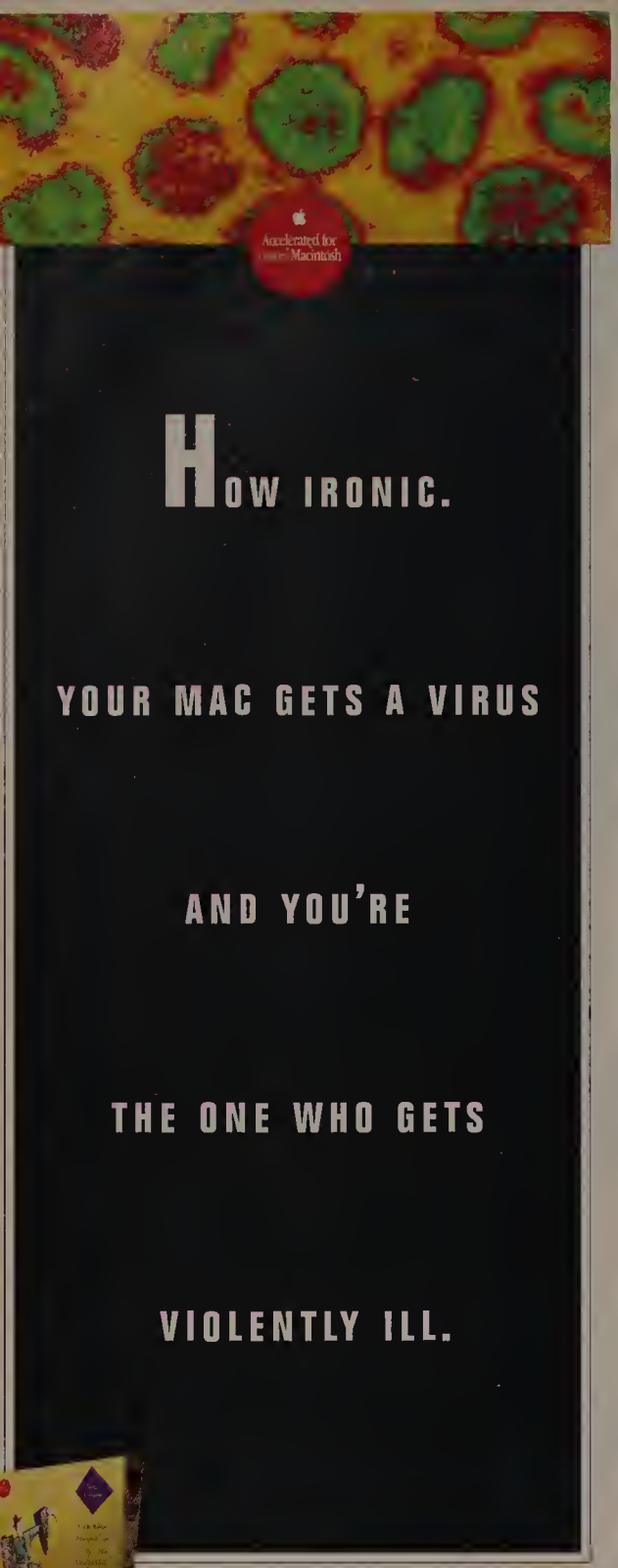
A plastic stylus, such as the type used on a graphics tablet or Newton, will not work on a TrackPad. Only an object with the correct capacitance characteristics will register. If you can find some kind of stylus filled with water, it may work, but be careful that it has a smooth, blunt tip that won't scratch the TrackPad.

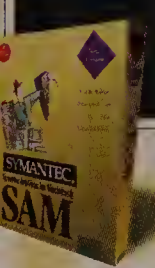
### PPP Out of Control

**Q** My Mac seems to have a mind of its own. I use MacTCP with a PPP dial-up connection, and have the Config PPP control panel's Disable Auto Connect option turned off so it will automatically dial and connect whenever I use an Internet application. Sometimes in the morning, the Config PPP control panel indicates that a connection was made overnight. My modem's control panel shows that my Internet provider disconnected the link after a time out. I have also seen this happen in the evening while I am watching TV. The computer just decides to call for a couple of pizzas?

KEVIN M. LIND
*Houston, Texas*

*continues*

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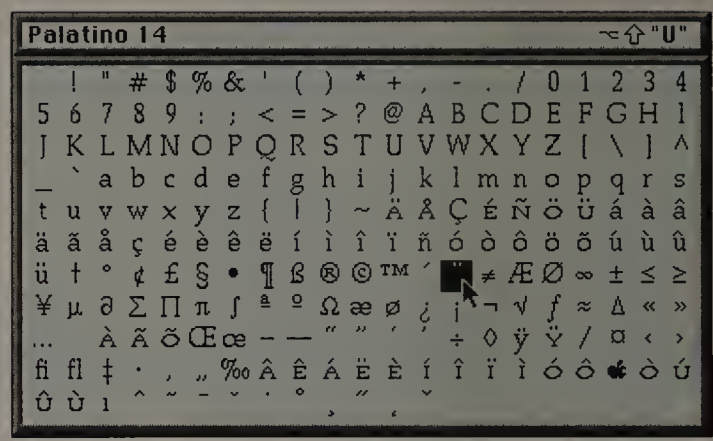
A According to the FreePPP FAQ document, MacTCP has an internal timer that causes a connection attempt after about 5½ hours of TCP network inactivity. Try one of these workarounds:

• Disable automatic connections. If you use FreePPP 2.5 or later, in FreePPP Setup turn off the option Allow Application to Open Connection. If you use an earlier version of FreePPP or any version of Mac PPP, turn on the Disable Auto Connect option in ConfigPPP. After disabling automatic connections, you'll have to manually connect and disconnect using FreePPP Setup or ConfigPPP, or with PPPremier, a great PPP timer that I described last month.

• Upgrade to System 7.5.3 (System 7.5 Update 2.0) and to FreePPP 2.5 or MacPPP 2.5. Then use the Network Software Selector application to switch from MacTCP to Open Transport 1.1.

• Turn off your Mac overnight. Save electricity and reduce the pollution that's a by-product of generating it.




**Alphabetical Order** This window, produced by Günther Blaschek's freeware control panel PopChar Lite 2.7.2, shows the standard Macintosh characters in alphabetical order and indicates how to type the highlighted character. The window appears when you click a hot spot or icon in the menu bar; you can then select a character and it appears in your document at the insertion point and in the correct font. Some fonts do not contain all the characters after the diaeresis (¨); the Mac OS substitutes a hollow box for a missing character. An alternative to PopChar is using the Key Caps utility, which comes with the Mac OS, to learn the keystroke for a character.

## Cursor Stuck

Q For years I have struggled with an intermittent cursor problem. In any number of writing programs, including TeachText, if I go back to a line previously completed in order to indent it, neither the spacebar nor the tab key will push the text ahead. I can delete the first letter, but then the text realigns itself as before with the first letter now erased. I try going to the line above and pressing return, but this does not work, either.

HARRIET HART
*New London, New Hampshire*

A Sounds like you are trying to indent a line in the middle of a paragraph. The symptoms you describe are normal in that context. When the program wraps a paragraph to fit the margins, it puts all blank spaces and tabs occurring after the last word of a line at the end of that line, never before the word that begins the next line. So if you set the blinking insertion point (the cursor) before the first word on a line in the middle of a paragraph and then type spaces or tabs, that "white space" all gets added at the end of the line above the insertion point. You must press return to start a new paragraph—or in many word processors, type shift-return to start a new line in the same paragraph—and then press tab or type spaces to indent the beginning of the line.

Incidentally, it's much better practice to use the tab key or the paragraph's indentation settings, not the spacebar, to indent a line. You get more accurate alignment that's not dependent on the font, font size, or font style of the blank spaces.

## First or Last, Pronto

**TIP** In most folder and disk windows, you can highlight the item that comes first alphabetically by pressing any number key or the spacebar. In most cases you can highlight the item that comes last alphabetically by pressing the option key along with any number key.

MELISSA YORK
*Austin, Texas*

*Those tricks, which stem from the ability to select an item by typing the first part of its name, work fine unless you have many item names that come after a bullet (•, option-8), including names beginning with most accented capital letters, most symbols you type with the option and shift keys, and some symbols you type with the option key alone. "Alphabetical Order" shows the*

*continues*

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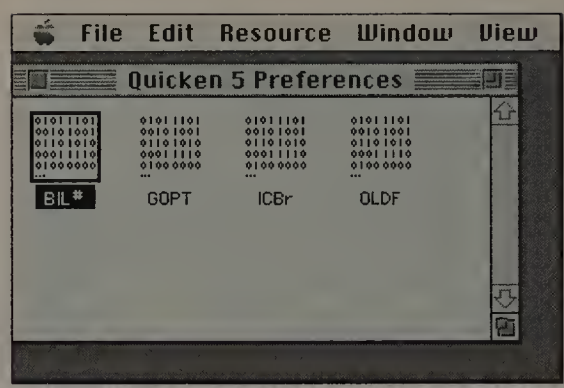


**Syncing Billminder** If opening an old Quicken data file causes Quicken's Billminder feature to start nagging you to pay old bills, use ResEdit to remove the BIL# resource from the Quicken preferences file located in the System Folder's Preferences folder. (As insurance, make a copy of the preferences file before editing it.)

*sequence of the Macintosh character set.*

*If nothing is selected in the active Finder window (or on the desktop, if no window has racing stripes to indicate it iss the active one), you can highlight the first or last item by pressing tab or shift-tab. With an item highlighted, pressing tab or shift-tab highlights the item that follows or precedes it alphabetically, and pressing an arrow key highlights the closest item on the desktop in the direction of the arrow.—L.P.*

## Billminder Time Trip

**TIP** If you back up your Quicken files (which I recommend) and you accidentally open a backup file, Quicken's Billminder starts tracking that file. Since the backup file is not current, Billminder starts reporting that your account has transactions due 10, 11, 12 days ago, ad infinitum. Even closing and removing the backup file does not remove the Billminder reminder.

The list of transactions that Billminder tracks is stored in Quicken 6's preferences file, which is located in the Preferences folder inside the System Folder. Removing this file clears up the Billminder problem—the next time you run Quicken 6 it makes a new preferences file—but you lose all your other Quicken settings by doing so.

You can use ResEdit to reset Billminder without affecting other preferences settings. First, make a copy of the Quicken 6 preferences file just in case something goes wrong. Then use ResEdit to open the Quicken 6 preferences file that is in the Preferences folder (not the copy you just made). One of the resource types is BIL#. Deleting this resource causes Billminder to forget which files it is tracking (see "Syncing Billminder"). The next time you run Quicken, turn Billminder back on. Quicken makes a new BIL# resource that tracks only the transactions in data files open at that time or later.

LAIRD MALAMED
*Los Angeles, California*

## Sharing ClarisWorks Macros

**TIP** Let's say you've created several ClarisWorks shortcuts you want to give to other ClarisWorks users. For instance, other people might be interested in a bunch of your shortcuts that automate typing of HTML tags. You could simply distribute copies of the ClarisWorks Shortcuts file from your Preferences folder, telling people to replace their files with yours. The drawback to this method is that people will lose any custom shortcuts they have already created.

Instead, follow these steps to create a file that people can use to add your shortcuts to theirs:

1. Make a new ClarisWorks word processing document and choose Edit Macros from the Shortcuts submenu in the File menu.

2. From the Macro pop-up menu, choose a macro that you want to distribute. Then attach that macro to the new document by selecting the Document Specific option. Repeat this step for all other macros you want to distribute, and then click Done to dismiss the Edit Macros dialog box.

3. Type instructions in the document telling others how to install the macros in their copies of ClarisWorks (hey, it's a built-in Read Me!), and save the document with a descriptive name. Here are the instructions you should type:

**To put the macros contained in this document into your copy of ClarisWorks, follow these steps:**

- **Choose Edit Macros from the Shortcuts submenu in the File menu.**
- **From the Macro pop-up menu, choose a macro that you want to install and deselect the Document Specific option. Repeat this step for all other macros you want to install, and then click Done to dismiss the Edit Macros dialog box.**

4. Go back and deselect the Document Specific option for all macros

*continues*

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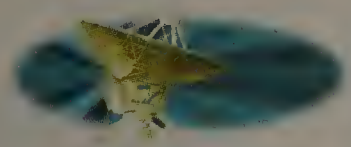

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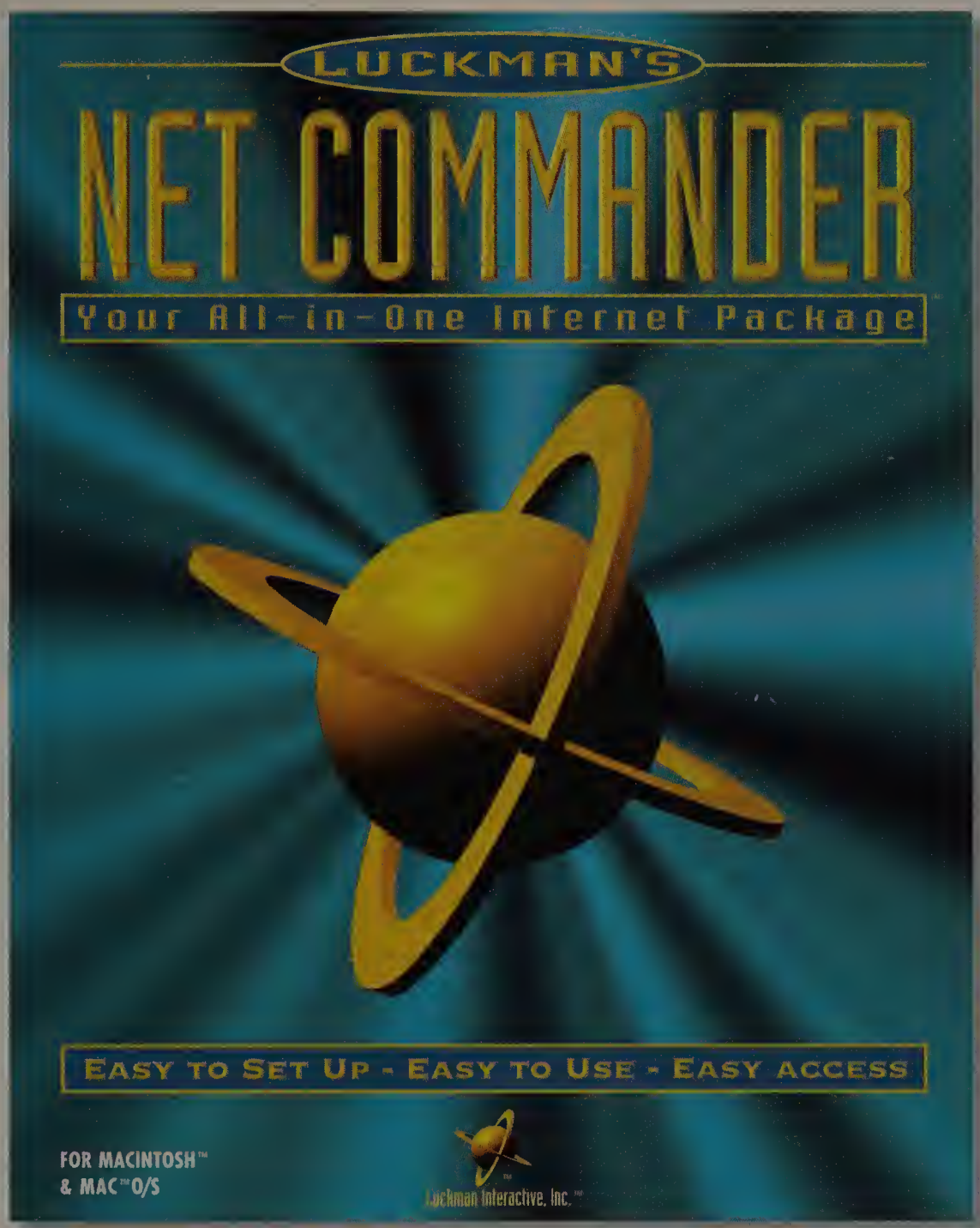


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CHRIS CRABTREE
*via Macworld Online*

## Quick Bits

• The logic-board upgrade that makes a Performa 63X, 52XX, or 62XX the equivalent of a Performa 6300, as described in July's *Quick Tips*, can be ordered from an Apple dealer. Apple's estimated street price for the Power Macintosh 5300/6300 Logic Board Upgrade is $769 with your old logic board in trade. Contrary to my July report, installation is extra.

• The Control Strip, which provides quick access to various control-panel settings, is not installed automatically on all desktop Macs using the Easy Install option of the installers for System 7.5.3 and System 7.5 Update 2.0 (contrary to what August's *Quick Tips* implied). You can use the installers' Custom Install option to install Control Strip, remarks David Sytsma of Higashi Kurume-shi, Japan. He also notes that instead of Control Strip, you can use Desktop Strip ($20 shareware), Extensions Strip ($15 shareware), or OneClick ($129; WestCode Software, 619/487-9200, *http://www.westcodesoft.com*). Those alternatives can be moved anywhere on screen, and have other advantages over Apple's control panel, which must stick to the left or right edge of the screen. Systma has a Web site (*http://www.calvin.edu/~asytsm89/*) dedicated to Control Strip, alternatives to it, and supplemental Control Strip modules.

• Alan Torrey of Carson City, Nevada, fixed crooked scans in Adobe Photoshop as described in August's *Quick Tips* until he discovered that it's easier with Photoshop's cropping tool. He selects the cropping tool and draws a box roughly around the image to be straightened, making sure the box isn't too close to the document's edge. Next, he rotates the cropping box by holding down the option key and dragging one corner of the box until it lines up with the crooked image. Then he adjusts the box to crop the image as desired. Finally, he clicks inside the box to have Photoshop straighten and crop the image in one step. You can simultaneously change the size of the cropped area by specifying a new size or resolution in the Cropping Tool Options palette before clicking inside the cropping box, says Scott Aronian of San Francisco. Chris Woodfield of Baltimore notes that the cropping tool can only rotate bitmapped images in 90-degree intervals. To rotate a bitmapped image differently, convert it to gray scale first.

• If you are having paper-feed problems with a Hewlett-Packard DeskWriter 520, 550C, or 560C printer, don't use a nail file to clean its rollers, as suggested in August's *Quick Tips*. Edward Lee of Toms River, New Jersey, reports that you can call 800/656-2324 and request HP's free roller-cleaning kit. The kit includes a cleaning plate with Scotch-Brite abrasive patches and special software to spin the printer's rollers.

• Do you need to download a Mac file from the Internet that won't fit on a floppy, using a Windows or DOS PC? Rather than breaking up a large file using a PC word processor (as suggested in August's *Quick Tips*), David Condit of Warrenton, Virginia, suggests you try using PKWare's DOS program PKZip 2.04g ($47 for DOS, $49 for Windows; 414/354-8699, *http://www.pkware.com*) to compress the downloaded file about 25 percent and, if necessary, split it across multiple DOS floppies. Then use the ZipIt 1.3.5 utility ($15 shareware; Tom Brown) on the Mac to decompress and join the segments from the DOS floppies into an .hqx file. Finally, drag the .hqx file to StuffIt Expander 4.0.1 (freeware; Aladdin Systems) or ShrinkWrap 2.0.1 (free for educational or nonprofit use, $20 for commercial use; Chad Magendanz) to convert it to a usable Mac file.

The Macintosh shareware and freeware mentioned this month is available from Macworld Online (*http://www.macworld.com*). m

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LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).

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We pay from $25 to $100 for tips published here. Send questions or tips on how to use Macs, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses.

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# Plugging In to the Web

by Cameron Crotty

No sooner had the World Wide Web hit the public awareness than everyone knew what it was missing—*media.* Parents in Peoria and wallabies in Weehawken clicked their fingerprints off climbing through a suddenly three-dimensional, cross-referenced cosmos of text pages, but—as anyone who has passing acquaintance with a remote control can tell you—the big problem with hypertext is that it's *text.* Users and Webmaster wannabes wanted sounds, pictures, animations, and movies to liven up otherwise dry pages.

A natural outlet for these types of shenanigans already existed in Web browsers' helper-applications architecture, present nearly from the Web's inception. Under this system, when a browser hits a file of a data type it doesn't understand, it consults a table listing helper applications. It chooses and launches the appropriate application and hands the offending file off. The browser then washes its hands of the matter, and the helper application takes over, displaying or playing the image, sound file, movie, or whatever. Depending on how the helper app is set up, it either stays open when it finishes its task or dismisses itself and releases its share of RAM.

All things considered, the helper-applications architecture hasn't been a bad solution. Without it, each browser would have to be programmed to display every data type its authors could manage, ignoring all others until the next upgrade. Even so, helper apps leave a lot to be desired. Because they are separate applications, they carry all sorts of undesirable baggage, wantonly devouring RAM space and requiring users to learn a new interface for each new helper. Worse, the movie, sound, or animation appears in an individual window, not integrated into the Web page. The Web was crying out for a way to get that content onto the page. Into the breach stepped Netscape's plug-ins.

**Plug-ins and the King**

Graphics people are familiar with the plug-in concept because of Adobe Photoshop's plug-in architecture, which permits artists to add new functions quickly and easily to the Photoshop engine by simply buying a package of plug-ins and installing them in a plug-ins folder. But while the terminology is similar, the Photoshop and Netscape architectures are fundamentally different. Photoshop plug-ins act on the data contained in a document; Netscape plug-ins are actually miniature apps—minus a lot of interface and file-system overhead. A browser hosting a Netscape-style plug-in actually hands over a chunk of RAM and some window real estate to the plug-in, enabling it to run as an independent, threaded process within the browser's memory partition.

On the other hand, though plug-ins are generally technologically superior to helper applications, they coexist peacefully. So if you have a favorite helper app, you can choose to have it handle particular data types by setting your browser's preferences.

Plug-ins overcome many drawbacks of helper applications. Most important to Web designers and aficionados, though, is that they enable media to be delivered within the browser window. This simplifies the user experience and integrates the presentations with the rest of the Web page. Also, users aren't forced to juggle multiple open apps.

One problem the Netscape plug-in architecture doesn't solve is that of memory gluttony. You might think that running plug-ins out of a single application would lead to a more efficient use of RAM resources, but in fact running a browser with Netscape plug-ins is something like feeding peanut butter–and-banana sandwiches to Elvis. While many plug-ins are relatively lightweight, others are downright piggish. Macromedia's Shockwave player, for instance, which plays specially prepared Director files in your Web page, weighs in at 1.1MB—and it's not the only or the worst offender.

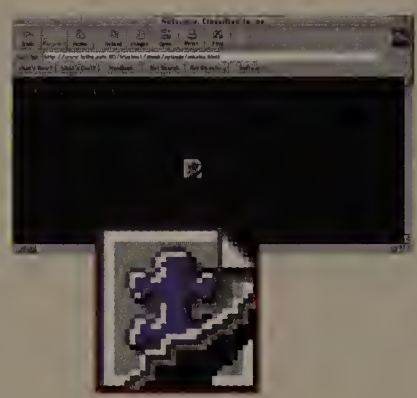
*continues*

# A Whip, a Chair: Taming Plug-ins

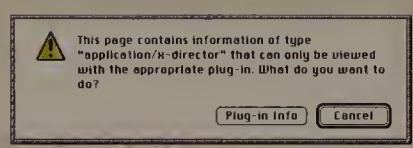
ONCE YOU HAVE THE RIGHT ONE for the data type you want to see or hear, these plug-ins rarely act up. Still, as with any new technology, you'll have to fiddle around to get them to work properly. Most of the serious problems you'll run into will be memory-related—running Navigator, Internet Explorer, or Cyberdog with plug-ins installed requires at least an 8MB RAM partition; 12MB or 16MB is even better. For Navigator 3.0, here's how to get the plug-ins you need and resolve other problems you may run into on your way to playing the coolest sites.

## YIKES! I DON'T HAVE THAT PLUG-IN. WHAT SHOULD I DO?

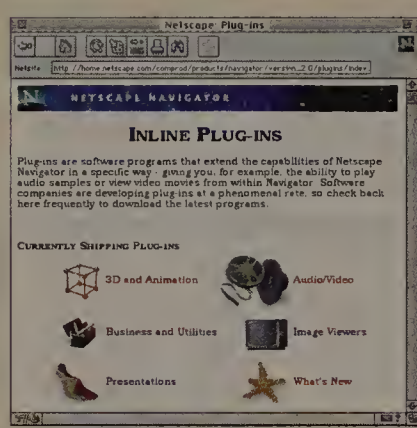
Content that requires a plug-in appears in Web pages within the Embed HTML tag. Upon encountering this tag, your browser determines if you've got a plug-in that handles the embedded data. If the browser can't find a plug-in for that type of data, it loads the Default plug-in, which puts up a broken plug-in icon.



Then the browser displays a dialog box that tells you what type of data your browser cannot understand.

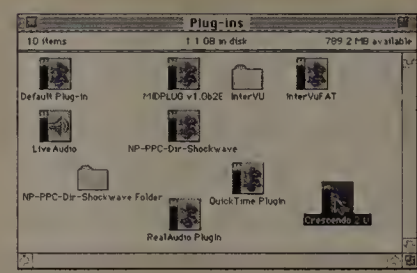



Clicking on Netscape's Plug-in Info button takes you to a page with some introductory instructions and a link to a registry page (*http://home.netscape.com/comprod/products/navigator/version_2.0/plugins/index.html*) where you can download a plug-in that handles the data type you need. (Microsoft Explorer's Default plug-in takes you to *http://browserwatch.iworld.com/plug-in.html*.)

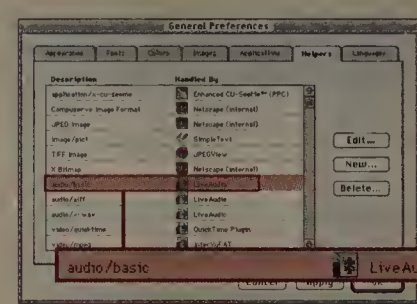


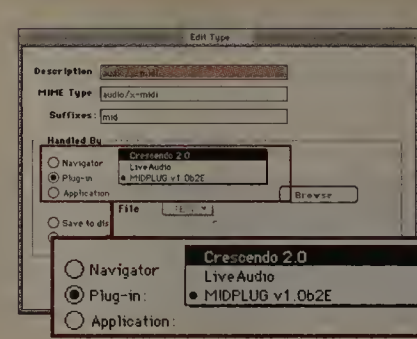

## I'VE GOT THE PLUG-IN, BUT I'M STILL CONFUSED

Once you've downloaded and unstuffed the plug-in, and used its installer, your browser should be ready to display the data it couldn't handle before. If you still get the broken plug-in icon, you may need to drag the plug-in into the Plug-ins folder within your main browser folder.




If a plug-in acts squirrelly, or Netscape launches a helper application when you know you have an appropriate plug-in installed, Netscape may be confused about which plug-in to use. If you visit lots of pages with plug-ins, you may have downloaded more than one plug-in for a certain data type (for instance, several plug-ins handle MIDI data). To help the browser out, call up the General Preferences dialog box and click on Helpers. (Explorer uses a similar preference screen to map file types to both plug-ins and helper apps.) Double-click on the data type.




Use the pull-down menu in the subsequent dialog box to select the plug-in you want to use.

Browsers typically swap plug-ins in and out of memory as needed, but cruise the Net with several windows open (a common practice), and you'll quickly negate this advantage. Even if you restrict yourself to one window at a time, running your browser with a partition of less than 8MB is asking for trouble. (For tips on making your plug-ins behave, see "A Whip, a Chair: Taming Plug-ins.")

### Browser Support

As with so many other Web-related developments, Netscape's plug-ins have led the way, and other companies have had to fall in or follow behind. The latest version of Microsoft Internet Explorer for the Macintosh (v2.0.1) supports Netscape plug-ins, although the Explorer team has provided support for the display of many common data types (such as QuickTime movies) directly within the browser code.

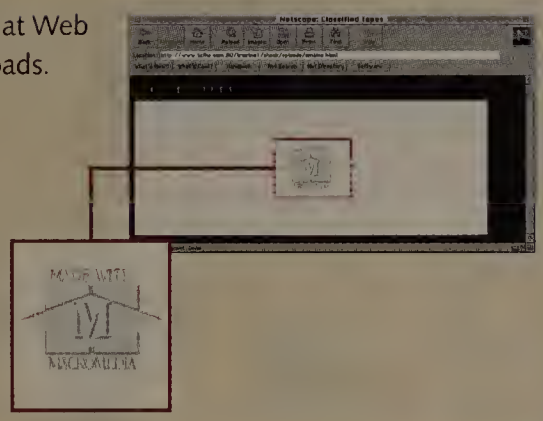
Microsoft is also starting to ramp up its own plug-in architecture, ActiveX. Microsoft claims that ActiveX, which is based on the company's COM component-software architecture, offers more flexibility for developers than Netscape's plug-ins without adding the overhead of a full-blown component-software architecture like OLE or OpenDoc. Microsoft says it will continue to support Netscape plug-ins through an ActiveX translator component when an ActiveX-capable version of Explorer ships on the Mac, supposedly by the end of the year.

Version 1.1 of Cyberdog, which should be available by the time that you read this, also supports Netscape plug-ins. Cyberdog, Apple's Internet-access tool, is a collection of OpenDoc parts, and version 1.1 includes a part that will accept Netscape plug-ins.

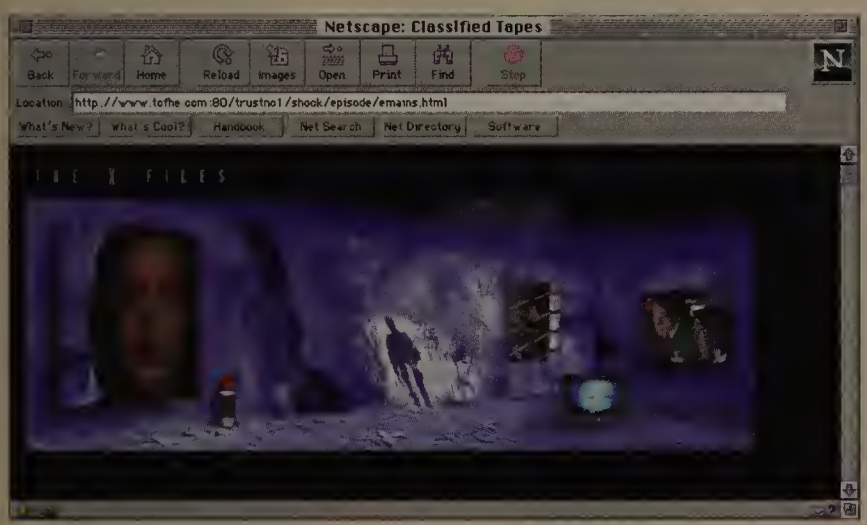
One neat side benefit of this approach is that, since any OpenDoc part can be embedded in any OpenDoc container, you can embed a Netscape plug-in within any type of document. For instance, in a spreadsheet report on the costs of streaming audio and video over the Internet, you could embed an

**I'VE GOT THE PLUG-IN IN PLACE; NOW EVERYTHING'S COOL**

Now, you're ready to hit that Web page again. The plug-in loads.



Loading plug-in




And ultimately, you see the page in all its noisy, frenetic glory.

OpenDoc part hosting a RealAudio Netscape plug-in.

Plug-ins have settled in and are maturing as a way to view multimedia content, but they'll do more than just play a 15-second movie trailer on a Web page. Browser plug-ins provide a doorway into the realm of component software—a world of trim, lightweight applications that perform specific functions but blend together to present a unified front to the end user. Look for an upcoming column to cover industrial-strength component software architectures, including Java, ActiveX, and OpenDoc. **m**

CAMERON CROTTY covers the Internet for *Macworld*.

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# Web Worthy

**Presidential Jockeying** 'Tis the season for sweaty-palmed punters yelling for their favorites; lathered, wild-eyed competitors with flaring nostrils; and dispassionate observers handicapping the results. The sport of kings is always in season (*http://horseworlddata.com/racing.html*), but in the United States, the sport of kingmaking comes only once every four years.

For those who like their politics with a spoonful of sugar, the Doonesbury Electronic Town Hall (*http://www.doonesbury.com*) sweetens straw polls and daily political briefings with Garry Trudeau's cartoons. For a harder liberal edge, see the MoJo Wire, *Mother Jones* magazine's home on the Web; don't miss Coin-Op Congress (*http:/www.mojones.com/coinop_congress/*), to find out which political action committees your candidate is beholden to.

Conservatives looking for shelter from legions of liberals and libertarians can launch to several right-leaning sites from the Conservative Internet Connections Group (*http://www.portcom.com/BMDesign/CICG/cicghome.html*). If you prefer your wisdom received, try the *New Republic*'s site (*http://www.enews.com/magazines/tnr/*).

If your taste runs more to the spectacle, head over to The Political Market (*http://www.raspberryhill.com/politics.html*), where you can trade shares of your favorite pols with fellow speculators. He who ends the elections with the most cash and credits wins.

My personal vote for political information goes to Vote Smart Web (*http://www.vote-smart.org/*), Project Vote Smart's online arm. Despite the fact that major candidates rarely respond to the organization's issues questionnaire (the *National Political Awareness Test*), Vote Smart maintains an exhaustingly extensive site, loaded with information about candidates and campaigns, and packed with links to sites on all sides of nearly every major issue in play in contemporary politics. If information is the keenest blade, then a few hours spent at Vote Smart Web will have you ready to slice and dice.

# Shareware PICKS

Plug-ins are popping up faster than election-year pundits, but you'll at least want to load up your utility belt with these basic bits.

**Macromedia Shockwave** Currently one of the hottest multimedia tickets available, Shockwave is powering Director-based animations at many high-end sites.

**Progressive Networks RealAudio** Number one with a bullet on the helper-app hit parade, RealAudio is way out in front of its streaming-audio competitors.

**Adobe Acrobat** Users may love it or hate it, but content providers dig Adobe's portable document format (PDF), especially for posting documents created in traditional page-layout packages.

**Apple QuickTime** Don't leave home without the hottest video ticket on the Web. Before too long, you should start seeing QuickStart movies, which you'll be able to begin playing before they're completely downloaded.

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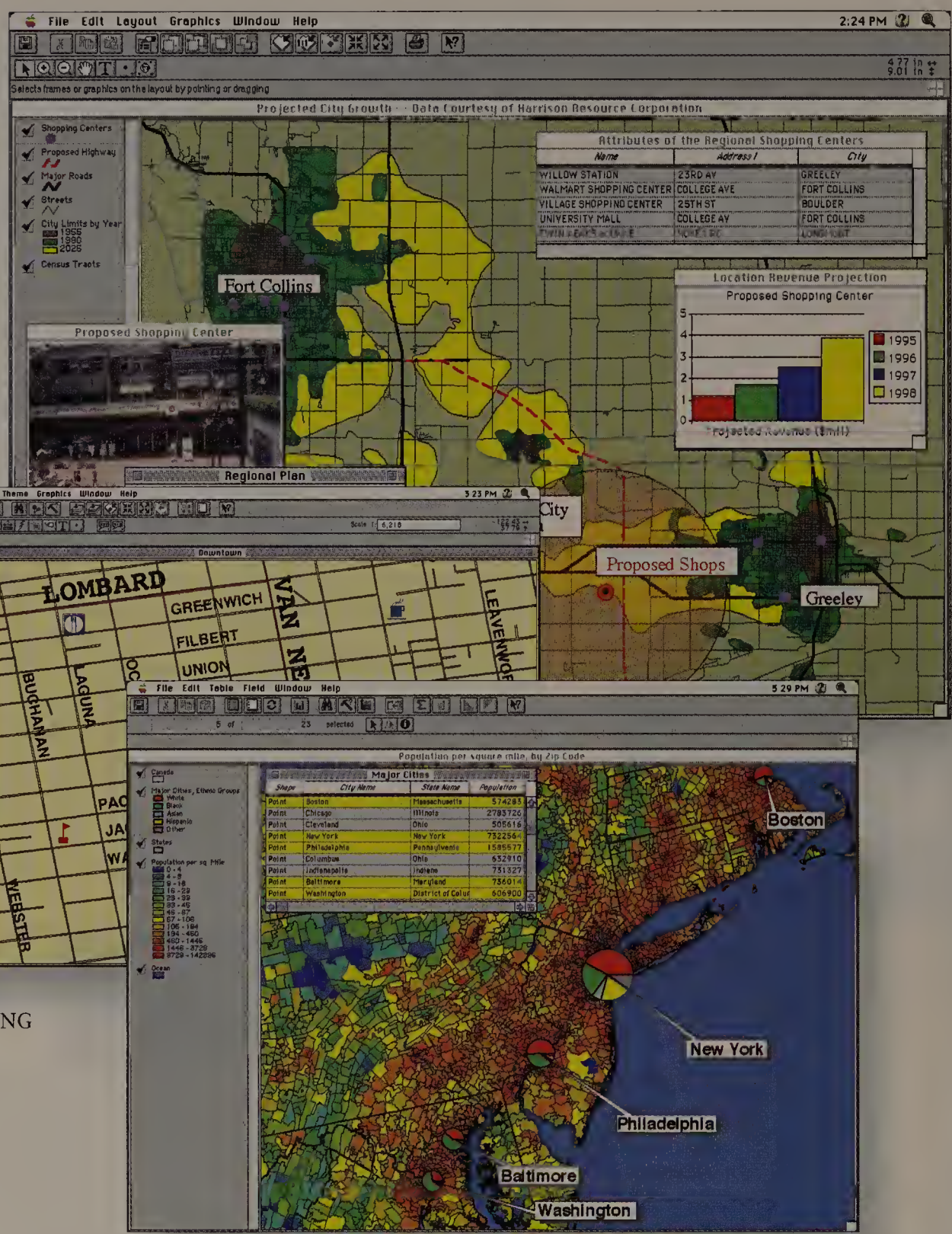


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# Media

# Optimizing the Power Mac 8500 for Media

HOW TO GET THE MOST FROM APPLE'S ULTIMATE MEDIA MACHINE

by Jim Heid

The Mac 8500, with its fast SCSI buses, even faster PCI expansion slots, and enhanced audio- and video-capture features, has captured the hearts of audio and video producers. The 840AV and the Power Mac 7100/80AV and 8100/100AV remain workhorses for producers who own NuBus-based hardware, but the 8500 wears the AV crown. Some quirks and subtleties behind the 8500's AV skills, however, are documented poorly if at all. Here's a guide to optimizing the 8500's built-in AV features, and a road map for when the built-ins aren't enough. For more information, visit *http://www.heidsite.com*.

### The Truth about Frame Rates

When Apple first showed *Macworld* the 8500, the product manager said it would capture 30 frames per second (fps) at 320 by 240 pixels (quarter-screen size). But after the 8500 shipped, Apple literature listed the maximum frame rate as 25 fps. Many 8500 owners may never see that.

The determining factor for the 8500's frame rate is hard drive speed. The 1GB drive that ships with many 8500's starts choking at about 20 fps. With a 2GB drive, the 8500 handles about 25 fps. For this column, I used an 8500/132 with a 4GB Micropolis AV internal hard drive from APS Technologies. This speedster captured at 28 to 30 fps, dropped frames occasionally, but by and large delivered smooth video.

The 8500's lead engineer says to get best results you need a drive that can support sustained writes of 4.5MB per second. Where that drive resides is important. The 8500 has two SCSI buses—the internal bus supports the Fast SCSI-2 transfer mode; the external bus (the rear-panel connector) doesn't. So if you're buying a high-performance drive for video capture, buy a bare drive mechanism and install it in the 8500's spare drive bay. Use the fast drive for video captures only; performance slows if that drive holds applications and the System.

### Video Output Demystified

The stock 8500 has great video-output features, but you must jump through hoops to use them. The 8500 can drive a monitor and a video device (such as a TV or video recorder) simultaneously, but only with 4MB of video memory (VRAM). Apple, in its finite wisdom, ships the 8500 with 2MB. That's where the hoops come in.

*continues*

# DIGITIZING VIDEO

To digitize and edit video with the 8500, connect your gear as shown here. If your video equipment lacks S-Video connectors, use its composite-video connectors instead, but note that video quality will suffer.

## Digitizing Tips

To get the fastest frame rates and smoothest movies from the 8500's built-in digitizer, follow these rules.

**RUN LEAN**

Turn off AppleTalk and file sharing, disable any extensions that aren't directly needed for processing video (especially anything time oriented, like calendar software), and quit any programs you aren't using.

**TWEAK YOUR DRIVE**

Capture to your fastest hard drive, and defragment that drive before your capture session and after adding or removing a large number of files. Use a utility such as Symantec's Speed Disk, part of Norton Utilities for Macintosh ($149; 541/334-6054, *http://www.symantec.com*).

**USE THE RIGHT SOFTWARE**

Avoid using the Apple Video Player utility that accompanies the 8500. Instead, use a video-editing program like Adobe Premiere ($795; 415/961-4400, *http://www.adobe.com*) or Avid VideoShop (bundled with the 8500).

**USE THE RIGHT SETTINGS**

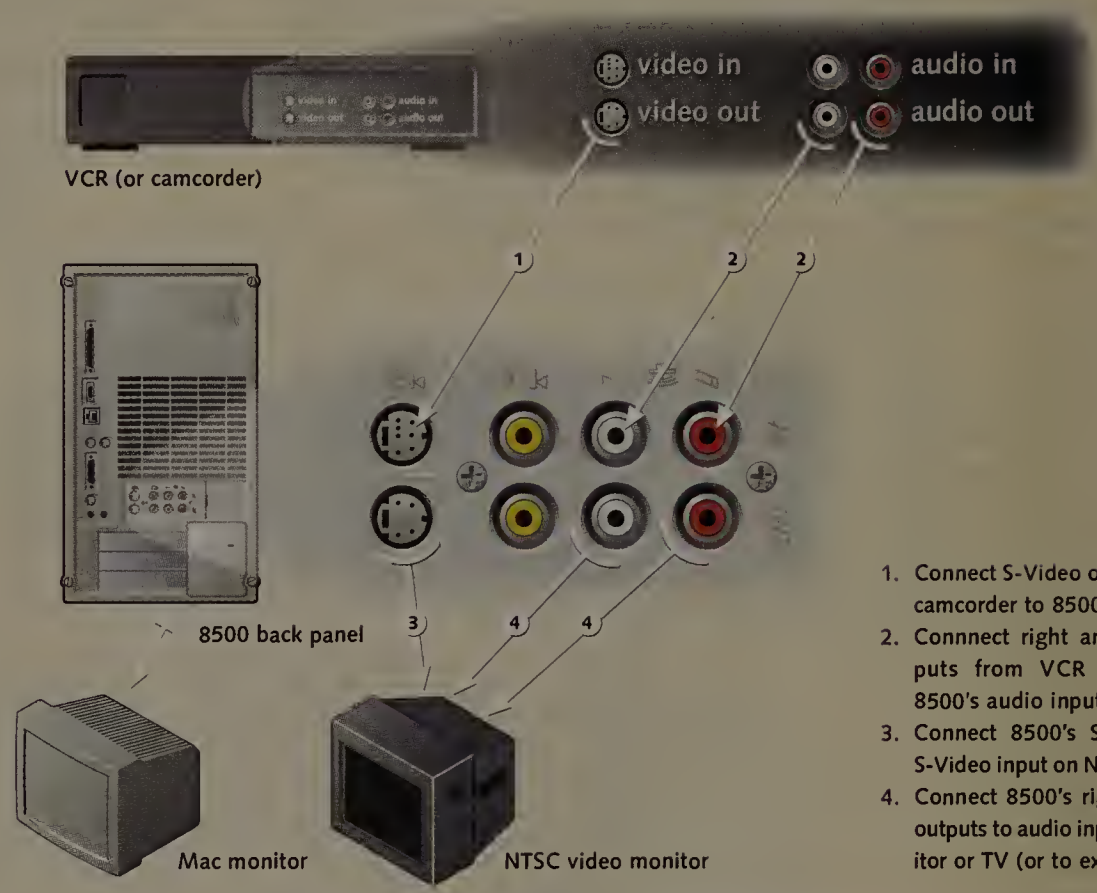
Specify a movie size of 320 by 240 pixels and use the Component Video compressor. (In your capture program's Video Settings dialog box, choose the Compression pop-up menu, then Component Video.)

**CAPTURE AUDIO AT 44kHZ, 16 BITS**

You may think you can conserve bandwidth by capturing audio at lower-quality settings, but you'll actually slow the 8500 by forcing it to resample the audio on the fly. If you want lower-quality audio settings (for a CD-ROM or Web movie, for example), convert the audio *after* you capture. (For details on audio optimizing, see *Media,* April 1996.)

**USE MILLIONS OF COLORS**

For the fastest performance, set all your monitors (Mac and NTSC) to display millions of colors. Don't mix video bit-depth settings, as this slows the 8500.




1. Connect S-Video output from VCR or camcorder to 8500's S-Video input.
2. Connnect right and left audio outputs from VCR or camcorder to 8500's audio inputs.
3. Connect 8500's S-Video output to S-Video input on NTSC monitor or TV.
4. Connect 8500's right and left audio outputs to audio inputs on NTSC monitor or TV (or to external speakers).

To display presentations on a TV (or tape QuickTime movies), you must connect a TV (or VCR) to one of the 8500's video-output jacks, shut off the Mac, disconnect its monitor, and restart. You're stuck viewing a TV (not as sharp as a monitor) or squinting through a camcorder's viewfinder to choose commands.

The solution is to upgrade the 8500's VRAM from the stock 2MB to 4MB. You need two 1MB VRAM DIMMs (at this writing, about $200). The extra 2MB lets you output to a video device without disconnecting the Mac monitor.

Your next acquisition might be an NTSC monitor, which shows how images look on a TV. That helps in designing graphics that look good within TV's relatively low resolution and color limitations. A dedicated 13-inch NTSC monitor typically sells for under $300. But many newer TV sets have composite-video or S-Video connectors, so you can use them as NTSC monitors.

An NTSC monitor lets you choose commands and navigate on the Mac monitor while viewing incoming video and digitized movies on the NTSC monitor. This is how high-end video systems work. All the 8500 needs to add this convenience is 200 bucks' worth of VRAM.

### OS Issues

The best version of the Mac OS for the 8500 is System 7.5.3 Revision 2. The 8500's original version, 7.5.2, is burdened with the infamous Open Transport 1.0 networking software and the user-hostile Sound & Displays control panel.

Then there's QuickTime itself. The latest release, version 2.5, provides better performance and a host of slick features. Download it from Apple's QuickTime Web site, *http://www.quicktime.apple.com.*

### The Secret to Filling the Screen

Another great feature of the 8500 isn't even mentioned in the manual or Apple Guide tutorials. That's the mysterious hardware-zoom mode that makes quarter-screen movies fill the screen. (It's easy to use; see "Recording to Tape.")

QuickTime has had software zooming since 2.0 shipped in 1994, but software zooming simply doubles each of the movie's pixels, resulting in a bad case of the jaggies. The 8500 *interpolates* pixels on the fly, creating a new pixel whose color and brightness lies between two existing pixels. A dedicated chip handles

# RECORDING TO TAPE

After you've edited a movie, you may want to record it to videotape for distribution. If your 8500 has 4MB of VRAM, you can connect your equipment as shown here. This enables you to use the Mac's monitor for navigation and your NTSC video device for video output.

## Video-Output Tips

**ACTIVATE HARDWARE ZOOMING**

To enlarge a 320-by-240-pixel movie, open the Monitors & Sound control panel (or the Control Strip) and set the resolution: at 320 by 240 pixels the movie bleeds off the edges of the TV screen; at 256 by 192 pixels the entire movie fits within the TV screen.

**USE MILLIONS OF COLORS**

Set all your display devices to millions of colors (see "Digitizing Video").

**USE PRINT-TO-VIDEO**

To get the smoothest playback and eliminate the movie's title bar and QuickTime controller bar, use a program that has print-to-video features (in Adobe Premiere and Avid VideoShop use the Print to Video command; in Apple's MoviePlayer use Present Movie). To tape the movie, choose the print-to-video command. Then specify a delay (try 5 seconds) so you have time to press your VCR's Record button. Finally, click on OK or press return and then immediately press your VCR's Record button.

**BEYOND BUILT-IN VIDEO**

If you need true full-screen video, you can choose from a world of third-party options ranging in price from under $1000 to well over $10,000. For this column, I tested miro's miroMotion DC-20 ($799; 415/855-0955, *http://www.miro.com*) and was extremely impressed with its image quality and overall operation. This card provides its own video connectors and digitizing circuitry, and thus works with other PCI-based Power Macs as well as with Windows computers. (Power Computing builds its AV models around this card.)

The DC-20's built-in compression circuitry provides a solid 30 fps at full-screen sizes and doesn't require an ultrafast hard drive or disk array to get there; I got beautiful results even from the 8500's stock 1GB hard drive. Yet the card still delivers S-Video quality: perfectly adequate for educational and industrial use.

1. **Connect 8500's S-Video output to S-Video input on VCR or camcorder.**
2. **Connect 8500's right and left audio outputs to audio inputs on VCR or camcorder.**
3. **Connect S-Video output from VCR or camcorder to S-Video input on NTSC monitor or TV.**
4. **Connnect right and left audio outputs from VCR or camcorder to audio inputs on NTSC monitor or TV (or to external speakers).**

hardware zooming, so there's no performance penalty. But to get the smoothest playback, your 8500 should have at least 24MB of RAM—preferably 32MB.

### Sounding Off

The 8500 is a formidable base for digital-audio work. Its RCA phono input and output jacks let you connect consumer-grade and semiprofessional audio gear, and its fast processor is up to the challenges that multitrack audio programs such as Macromedia's Deck II impose.

But there's always room for improvement. When recording to or from a digital audiotape (DAT) recorder, you should connect it to digital inputs and outputs. The 8500 lacks such beasts, forcing you to use the DAT recorder's analog ins and outs—and that puts your sound through additional, noise-inducing analog-to-digital conversions.

An ideal solution is the Audiomedia III card from Digidesign ($795; 415/842-7900, *http://www.digidesign.com*). This PCI expansion card provides its own digital-analog converters, as well as digital inputs and outputs. The Audiomedia III provides up to eight playback tracks and can record up to four tracks simultaneously. (A stock 8500 can record just two simultaneous tracks.) The card works with Digidesign's ProTools software and Digidesign-compatible programs such as Mark of the Unicorn's Digital Performer.

The 8500 is a media mogul now, but the future looks even better. Now that DayStar Digital is selling multiprocessor upgrade cards, you can replace your 8500's single PowerPC processor with a dual-processor card to get screaming performance with video compression under QuickTime 2.5 and with programs that support multiprocessing, such as Adobe After Effects and Photoshop (see "The Best Media Machine" in this issue). Apple sources tell me there will soon be a selection of expansion cards for the 8500's digital audio-video (DAV) connector, cards that enhance the 8500's built-in digitizing features—by adding full-screen capture support, for example. These developments hint that the 8500's AV reign will last for some time. m

**Next month: Designing graphics for TV**

JIM HEID produced the CD-ROM that accompanies his *Macworld New Complete Mac Handbook*, fourth edition (IDG Books Worldwide, 1995).

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# Publishing Workshop

## Using Swatch Books for Predictable Color

by Steve Roth

The holy grail of desktop publishing has always been WYSIWYG: what you see is what you get. Your screen matches what comes out of your laser printer, which matches the final, printed piece. A noble vision indeed—but elusive. Nowhere has that goal been more difficult to attain than in the world of color. Color-management systems such as Apple's ColorSync, carefully implemented, can help a lot, but I warn color publishers that WYGIWYG is more likely: what you get is what you get.

The simplest way to predict color accurately is to ignore on-screen colors (which are just reminders of what color you applied to what), and choose colors from swatch books—printed samples that show what will come off a printing press when you specify a color in a certain way. Find a color you like in the swatch book, specify it in your software, and the results from the printing press will be pretty close to the printed swatch.

A host of factors can affect the final printed color. For example, you probably use a different paper stock than that of the swatch book and print on a different press, perhaps with slightly different inks, so you'll still need to use some judgment. But nothing gives you a better idea of what will print than something that's actually printed.

So, which swatch book should you use? The first thing to consider is your printing method. Are you printing with the four process-color inks (creating all colors by printing separate passes of cyan, magenta, yellow, and black inks), or with spot-color inks (where the printer mixes the ink to make the color you want)? (Pantone is the dominant spot-color system in the United States. In other countries, you might use other systems, such as Toyo in Japan.)

If you're printing with spot-color inks, you can simply refer to a Pantone spot-color swatch book. Choose a color, select it in your software's color picker, and when you print separations, out comes a single piece of film for that plate. The printer mixes the ink according to Pantone's formula, and the color you get off press should match the color in the swatch book.

For process color, you have more choices of swatch books, but one thing's for sure: choosing colors for process-color jobs using a Pantone spot-color swatch book is a recipe for surprise and disappointment. Those beautiful Pantone ink colors can often be simulated using process inks, but most of those simulations aren't very close. Check out the *Pantone Process Color Imaging Guide* swatch book, and you'll see the difference between Pantone inks and their process simulations. **m**

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Contributing editor STEVE ROTH is the editor of *Real World Photoshop 3* (Peachpit Press, 1996).

## Specifying Swatch Colors

Once you've chosen a color from a swatch book, how do you specify it in your software? As with most things print related, it depends on whether you're printing with four-color process or Pantone (spot-color) inks.

### PROCESS SPECIFICATIONS

When you define process colors, the name doesn't matter at all, but the specifications (the percentages of the four process colors) definitely do; they determine the color that will come off the press.

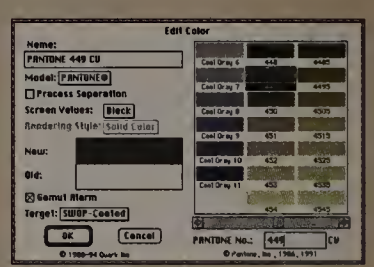
Choose a color from a process-color swatch book, read the CMYK values in the book, and type them into your software's color-definition dialog box (in CMYK mode). Colors on screen and from color printers may look lurid and weird, but what comes off press will pretty much match the swatch book.

Some of the process swatch books have color-library equivalents in publishing and illustration software. You can certainly use these canned sets of predefined colors to indicate your choices from a corresponding process swatch book, but it's nothing more than a convenience. You can just as easily define them yourself by typing in the CMYK values.

In QuarkXPress, you specify process colors by entering CMYK values in the Edit Color dialog box.

### PANTONE SPECIFICATIONS

With Pantone inks, you can name a color anything (say, "swamp" for muddy green) and specify it in any color model—RGB, CMYK, HSB. That specification affects what's on screen and what comes out of color printers. The final color depends solely on the




Like many page-layout and illustration programs, XPress offers Pantone libraries for easy color-spec'ing.

# Choosing a Swatch Book

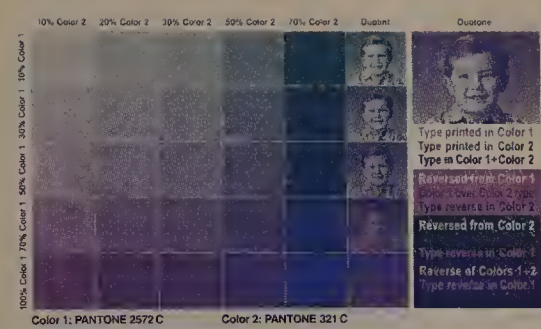
In the United States, selecting a spot-color swatch book is easy—there's really only one standard. For process-color work, there's a wider variety. Swatch books often come in two versions, on coated and uncoated paper, because uncoated stock's absorbency affects the way colors look. Most art-supply stores carry swatch books.

**Pantone Color Formula Guide** (Pantone, 201/935-5500, *http://www.pantone.com*; $69.75). This guide replaces the *Pantone Color Selector*, which has long been the basic tool for spot-color work in the United States. The new guide contains swatches of the basic 1012 Pantone spot-color ink mixtures, on coated and uncoated paper, with number identifiers for communicating with the printer. (Note that for the Pantone books shown here, the process color reproduction may not match the Pantone-identified solid color standard.)

**Pantone Two-Color Selector** (coated and uncoated versions, $185 for the pair; Color and Black Selector and Color Tint Selector also available for $185 each). There's no better way to stretch a limited print budget—and get a diversely colorful piece—than by combining tints of two Pantone inks. These "Color + Color" books show tint builds for 240 pairs of Pantone inks, plus overprinted and reversed type and a duotone for each pair. This subset of the million-plus possible two-color Pantone combinations is a good start and is cheaper than printing your own two-color swatch books.

**Pantone Process Color Imaging Guide** (coated version only, $88). This fan book shows 942 Pantone spot colors that can (according to Pantone) be simulated reasonably well using the four process inks. (Any software offering a Pantone ProSim library contains this subset.) The Pantone ink swatch is printed next to the process-simulation swatch to show the potential variance between a Pantone custom ink and its process-color simulation.

Pantone Color Formula Guide

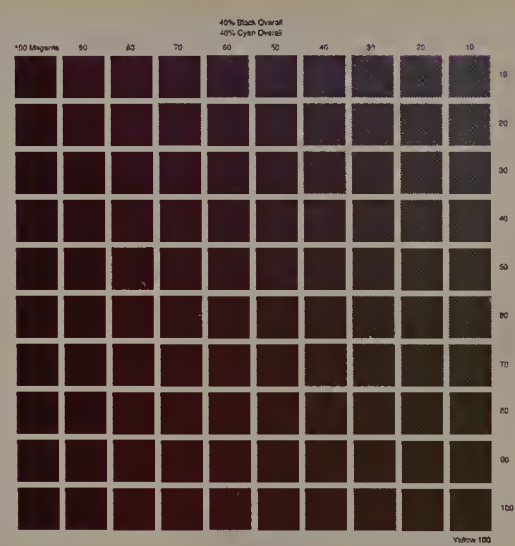



Pantone Two-Color Selector

Trumatch Colorfinder

Pantone Process Color Imaging Guide

Pantone Pastel and Metallic Guides



Computer Color

PostScript Process Color Guide

**Pantone Pastel and Metallic Guides** (pastels $32, metallics $42). These fan books show additional Pantone ink mixtures available. These colors are difficult or (for metallics) impossible to simulate with process inks. Don't even think about WYSIWYG.

**Pantone Process Color System Guide** (coated version only, $75). This fan book has swatches and specs for 3000 process colors. It's not related to Pantone spot colors; it's just a process-color book.

**Trumatch Colorfinder** (Trumatch, 212/302-9100, *http://www.trumatch.com*; coated and uncoated versions, $85 each). These fan books contain more than 2000 process-color swatches and specifications. Because of their organization, I prefer these books to the *Pantone Process* fan book; they make it easy to select a color, and then find lighter and darker versions of the same hue.

**Computer Color: 10,000 Colors** by Michael and Pat Rogondino (Chronicle Books, 415/777-7240, *http://www.chronbooks.com*; coated version only, $24.95). This 10-by-10-inch book is organized into pages with one-, two-, three-, and (shown above) four-color tint builds. This book offers more colors per dollar than any other.

**PostScript Process Color Guide** (Agfa Prepress Education Resources, 708/296-6703, *http://www.agfa.com*; $30). This 12-by-12-inch guide contains more than 16,000 swatches, set up very cleverly. The first 12 pages range from 0 percent through 100 percent yellow in 5 percent increments, with percentages of magenta and cyan running down the side and along the top (resulting in 1728 swatches). The next 12 pages are the same, except each swatch is overlaid with black tints at 5, 10, 20, and 30 percent. Then the whole thing repeats on uncoated stock. This is my favorite process-color swatch book, especially given the price.

ink the printer mixes. It's most convenient, however, to choose Pantone colors from your software's color library for three reasons.

- The color specifications are defined to give you the best rendition on screen and from color printers.
- Layout and illustration software now use consistent Pantone names. Import a FreeHand EPS file containing Pantone 449 into a PageMaker file with the same color, print the separations, and you get one piece of film for 449, which is what you want.
- The film is labeled "Pantone 449," not "swamp," so the printer knows exactly which ink to mix up.

# Graphics Workshop

## Blending Objects in Photoshop with Layer Masks

by Cathy Abes

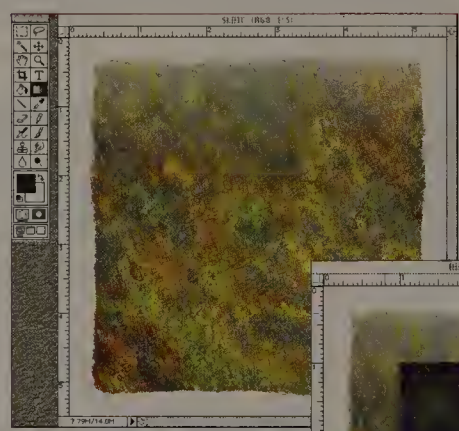
**ARTIST** Former art director Don Bishop now produces digital collages and 3-D illustrations in his own studio in Southern California. You can view examples of his work on his Web site, *http://www.dbimage.com*.

**HOW IT WAS DONE** Using layer masks in Photoshop is a quick and easy way to create a subtle blend between two images, as in this illustration: between the water and the background texture, and the fish and the water. An alpha channel must be loaded before you can see its effect on a selection; in contrast, a layer mask lets you work more interactively, displaying its effect immediately on application. This makes it possible to experiment with different masks without having to create a new channel each time.

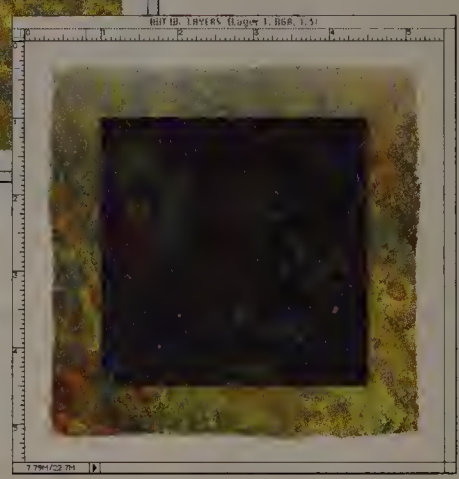
For the background, Bishop scanned a slate tile. Enlarging a small section of the scan, he composited it with the original tile. After experimenting with various opacities, he adjusted the hue slider to make the layer pink; this changed the composite texture from purples and browns to a brighter range of jewel tones.

After making a layer for the shadow, Bishop used the layer mask from the slate texture to block out the shadow; if he hadn't, the shadow would have composited with the background and the slate texture, resulting in a less-than-pleasing color and texture (in this case, a washed-out magenta and gray).

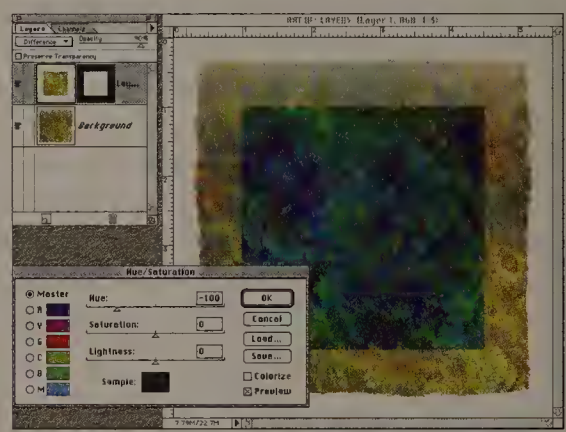
**THE TOOLS** Hardware: Quadra 650 with 40MB of RAM and a 500MB internal hard drive; Radius Intellicolor 20-inch monitor; Apple 13-inch monitor; Radius Color Card with Photo Booster; Studio Scan II scanner; Pinnacle Micro 128-230 M/O drive; Micronet 44MB SyQuest drive. Software: Adobe Photoshop 3.0. m



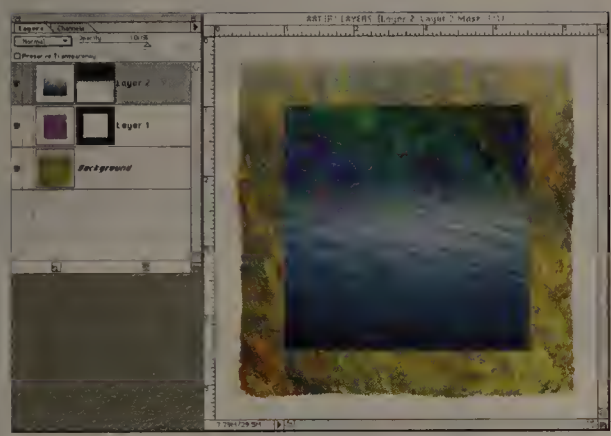
1 Bishop scanned a piece of slate tile to use as the background for his image.



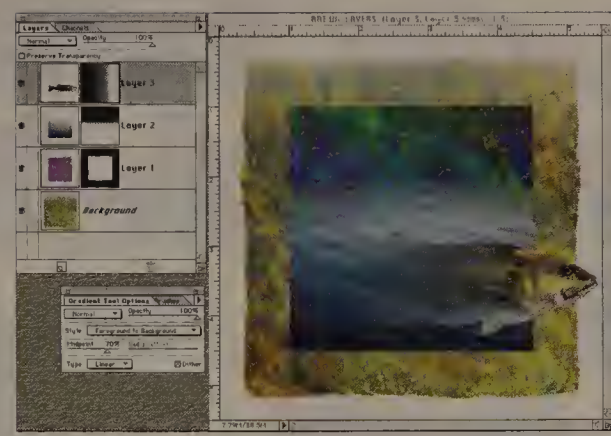
2 He created this striking texture for the center area by enlarging a 1-by-1-inch section of the tile. He then created a layer mask and composited it with the original tile in Difference mode at 100 percent opacity.



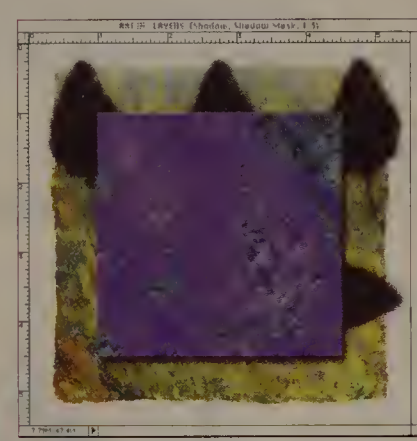

3 To achieve the vibrant blues, greens, and purples in the square tile texture, Bishop adjusted the hue and reduced the opacity to 90 percent.



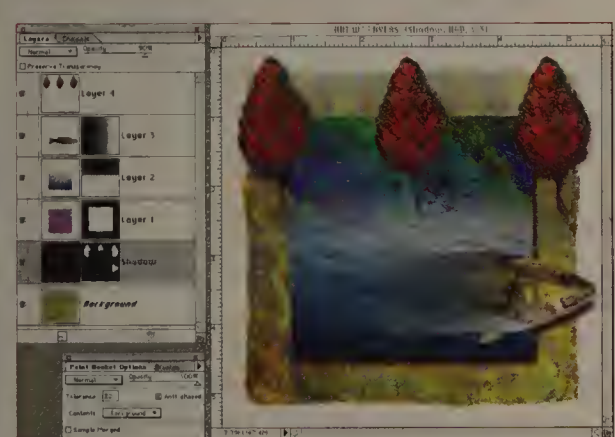
**4** A photograph he'd taken of water became the next layer; its accompanying layer mask—containing a vertical black-to-white blend—kept the water inside the edges of the background.



**5** Next came the photo of the bass; he created a layer mask with a horizontal blend from transparent (left) to opaque (right), reaching 100 percent opacity before the bass overlapped the edge of the water texture so the water wouldn't show through the fish.



**6** Bishop made a new layer for the shadow and put it on top of the background but behind everything else. Here's how the slate texture would have looked if he hadn't then deleted the shadow layer mask from the composite area. The colors are muddy and the texture nearly obliterated.



**7** After sandwiching the shadow layer between the background and the tile-texture layer, Bishop added a layer mask for the shadow. Next, he loaded the layer mask for the tile texture into the shadow layer and inverted the mask (Image>Map>Invert) to eliminate the shadow underneath the tile texture. This allowed the slate texture to composite correctly with the background, maintaining the rich hues he'd originally created.

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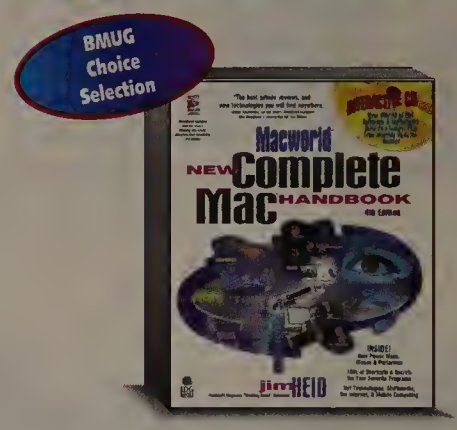


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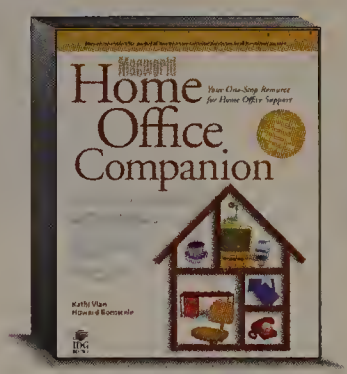


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1a. For which of the following Mac-related products do you specify, recommend, approve, purchase or influence the purchase?

1b. Which of the following do you plan to purchase in the next 12 months? (Check all that apply.)

| | Purchase Involvement | | Plan to Buy |
|---|---|---|---|
| Desktops/PowerBooks | ◯ | 1 | ◯ |
| Monitors | ◯ | 2 | ◯ |
| Printers | ◯ | 3 | ◯ |
| Storage Devices | ◯ | 4 | ◯ |
| Networking/Data Communications | ◯ | 5 | ◯ |
| Internet/Intranet products/services | ◯ | 6 | ◯ |
| Software: business/productivity | ◯ | 7 | ◯ |
| graphics/design | ◯ | 8 | ◯ |
| interactive publishing/ multimedia | ◯ | 9 | ◯ |
| entertainment | ◯ | 10 | ◯ |
| education | ◯ | 11 | ◯ |
| other software | ◯ | 12 | ◯ |
| Any other products | ◯ | 13 | ◯ |

2. Are you employed, and involved in purchase decisions for 5 or more Macs? ◯ Yes (1) ◯ No (2)

3. What's Your Opinion?
What are your main frustrations in making Mac-related purchase decisions?

- ◯ 1. Lack of expertise in assessing products
- ◯ 2. Difficulty in installing or using products
- ◯ 3. Too many choices
- ◯ 4. Not enough choices
- ◯ 5. Unclear needs
- ◯ 6. Concern that cheaper, better products are about to come out
- ◯ 7. Other (please specify) _____

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951 Mail Order Companies
952 Printers
953 Scanner & Digital Cameras
954 Online/Internet
955 Storage Devices
956 Monitors & Graphics Boards
957 Utilities
958 Clip Art & Fonts
959 Memory
960 Draw/Paint/DTP Software
961 Image-Editing Software
962 Other Graphics Software

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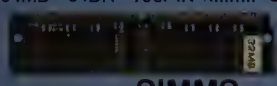

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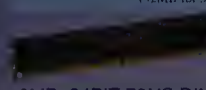

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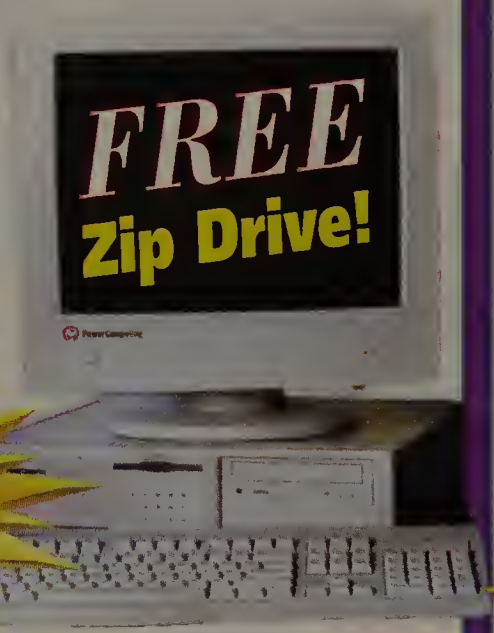


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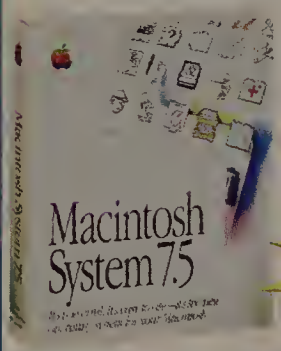


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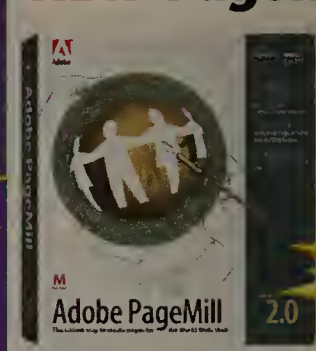


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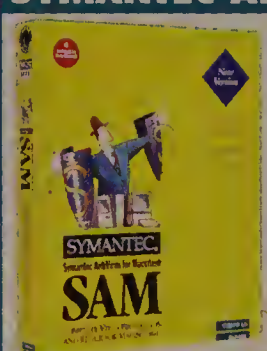


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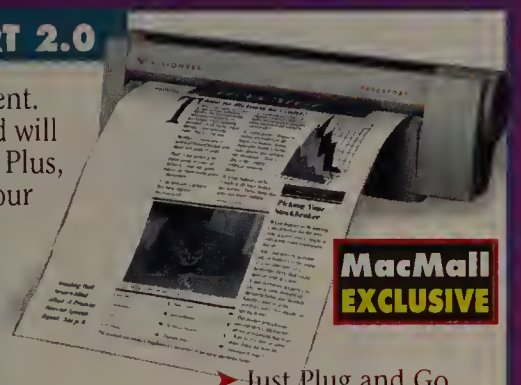

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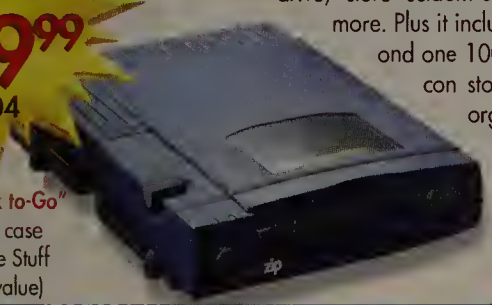

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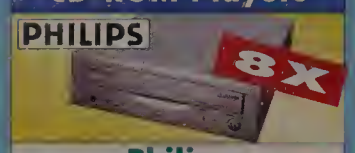


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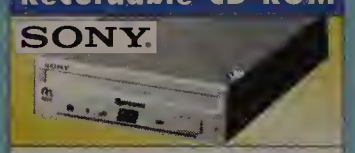


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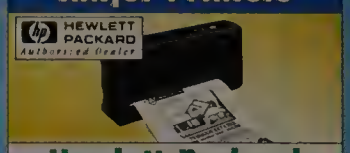


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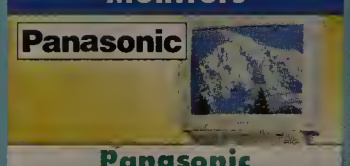


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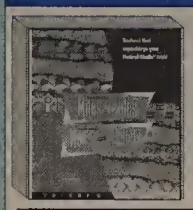

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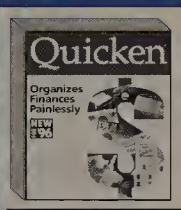


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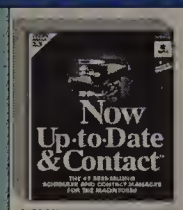


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**$369.95** (NEC CS00)

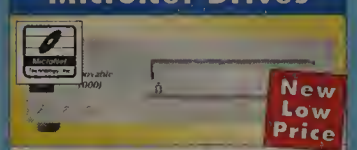
**NEC MultiSync C400 14" Monitor** (NEC C400) ..... $284.95
**NEC XV15+ 15" Digital Monitor** (NEC XV15+) ..... $469.95
**NEC M500 Multimedia Monitor** (NEC M500) ..... $499.95

### Philips CDD2010/40 External CD-ROM Recorder

•Create your own CDs •2x write/4x read •Comes with Corel *CD Creator*, SCSI card/cable, terminator, two blank CD-ROM discs and one boot floppy •Designed for Macintosh

**$699.95 reg. price**
**-100.00 mail-in rebate**
**$599.95 final price** (PHI CDD2010/40)

### MicroNet Drives




**MicroNet Advantage**
External 1-Gig Jaz Drive
•File size will no longer limit you, with the combination of Jaz drive and disks •Faster than most hard drives •1-GIG of disk space on each cartridge •Includes one cartridge

**$519.95** (MNT AOV1000JAZE)

**Micranet 200MB SyQuest Drive** (MNT AOV-SYQ200E) ..... $499.95
**Micranet Internal Jaz 1-GIG Drive** (MNT AV1000JAZI4) ..... $579.95
**2 Micranet 1-GIG Jaz Drives in one cabinet** (MNT SS2000JAZA) $1149.95

### Global Village

**Global Village TelePort Platinum™**
28.8Kbps Data/Fax Modem
•Send and receive data at up to 28,800 bps •Fax in background as you work •V.34 data compression for fast throughput up to 57.6Kbps •Flash ROM upgradable •Comes with GlobalFax™, GlobalFax™ OCR and data communications software for System 7 and later •For Macintosh desktops

**$199.95** (GLV TELEPRTPLTN)

**TelePort Platinum / Internet** (GLV TELINTERNET) ..... $199.95

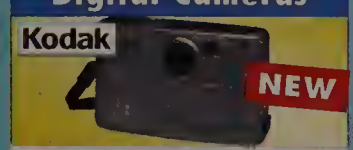
### Global Village

**Global Village PCMCIA PowerPort Platinum™ PC Card**
•28,800 bps data (v.34 data compression), 14,400 bps fax •GlobalFax™ and GlobalFax™ OCR and PC Card Enhancement software provided •PCMCIA card for Apple PowerBook 190 and 5000 series •Fits PCMCIA Type I and II slots

**$339.95** (GLV PCMCIAPLTNM)

**PCMCIA PowerPort Platinum Pro** (GLV POWERPLTPRO) ..... $499.95

### Digital Cameras

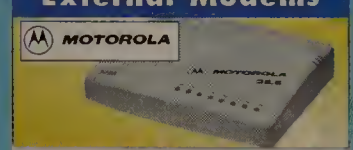



**Kodak DC20**
Digital Science™ Camera
•Shirt-pocket size •24-bit color •1MB storage •Focus-free lens with auto exposure •20-inch to infinity focus distance •Comes with software for Mac and PC

**$329.95** (KOD DC20)

**Connectix Color QuickCam** (CNM CQCM) ..... $229.95
**Kodak Digital Camera 40** (KOD DC40) ..... $599.95
**Kodak Digital Camera 50** (KOD DCS0) ..... $999.95

### External Modems

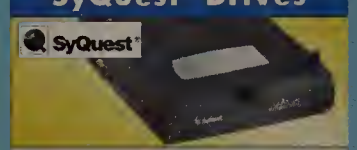



**Motorola ModemSurfer**
Ext. 28.8Kbps Fax/Modem
•28,800 bps/14,400 bps S&R data/fax modem •V.42bis and MNP-5 with throughput up to 115.2Kbps •Communication & fax software for Mac

**$119.95** (MOT MAC2BBSURF)

**Zoom V34XMac External Fax/Modem** (ZOP V34XMAC) ..... $139.95
**Supra Express v.34 Fax/Modem** (SRA S0-28XP-MC) ..... $159.95
**U.S.Robotics Sportster®/Speakerphone** (USR EX2BBMACVC) ..... $199.95

### SyQuest Drives

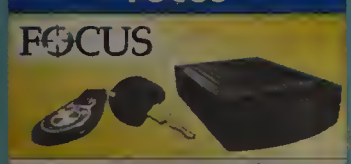



**SyQuest EZ230**
230MB External SCSI Drive
•230MB formatted •13.5msecond average access time •Reads 135 cartridges •Includes 1 235 cartridge

**$299.95** (SYQ EZ230EXT)

**SyQuest® EZ135 Drive** (SYQ EZ13SEXT) ..... $119.95
**SyQuest® 200MB Cartridge Drive** (SYQ S914126) ..... $399.95
**SyQuest® 270MB Cartridge Drive** (SYQ S9B4126) ..... $399.95
**Micranet 200MB SyQuest® Drive** (MNT AOV-SYQ200E) ..... $499.95

### FOCUS

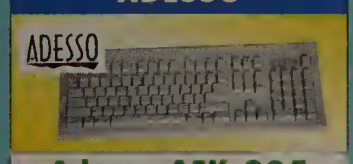


**Focus L•TV Micro**
Macintosh Presenter
•Converts Mac VGA/video signal to standard TV, so you can use TV as presentation device, or record video output from VCR

**$149.95** (FOC LTVMICROMAC)

**Focus LapisCalar,** video/ethernet exp. card (FOC LCMVB-EN) ..... $149.95
**LapisCalar MV16,** 16-bit video card for S300 only (FOC LCMV16) .$159.95
**LapisCalar MV16-EN,** video/ethernet (FOC LCMV16-EN) ..... $179.95

### ADESSO

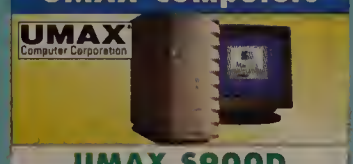


**Adesso AEK-305**
Soft Touch Plus Extended Keyboard
•105 silent, high quality, full stroke mechanical keyswitches •2 extra ADB ports •Keyboard-length wrist pad •One-year warranty

**$54.95** (AEO AEK-305)

**Adesso AM-3 PowerMouse** (AEO AM-3) ..... $24.95
**Adesso Tru-Form Keyboard** (AEO AEK-606) ..... $89.95
**Adesso Tru-Form Keybd w/Painter** (AEO AEK-806) ..... $99.95

### UMAX Computers

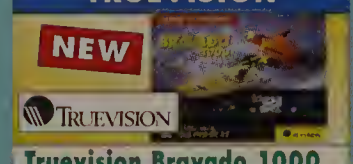



**UMAX S900D**
150MHz Mac OS-Compatible MiniTower Computer
•150MHz 604 Power PC™ CPU •16MB RAM •8x-speed CD-ROM •6 PCI Slots •3 expansion drive bays •Built-in SCSI-2 and 10Base-T •2 Serial and 2 ADB Ports •Includes Extended Keyboard and Mouse •Monitor, hard drive and video card not included

**$2999.95** (UMX S900D/150)

**UMAX S900L** (UMX S900L/150) ..... $3699.95

### TRUEVISION




**Truevision Bravado 1000**
Professional Digital Video Editing Solution
•Includes the full Adobe *Premiere (4.2)*, a $795 retail value •Full screen video capture at 50/60 fields per second •Variable rate, real time motion JPEG compression •24-bit true color capture •Two composite inputs and one S-video input •Two simultaneous video outputs •32-bit PCI local bus with burst DMA •Conversion to popular computer video formats

**$899.95** (TRU BRAVADOMAC)

### Removable Media

**1GIG Jaz Cartridge**
**1GIG Cartridge**
**Iomega** (BER MAC1GIGCART) .$124.95 EA
**Micranet** (MNT CR1000JAZ) $124.95 EA

**Iomega 100MB Zip Cartridge**
(BER MAC100MBOSK) ...each $19.95
(BER MAC100MBTRI) .. 3 Pack $49.95
(BER MAC100MBTEN) 10 Pack $149.95

**SyQuest® Cartridges**
44MB (SYQ SQ400) ..... $39.95
88MB (SYQ SQ800) ..... $39.95
105MB (SYQ SQ105) ..... $49.95
135MB (SYQ 135MB) ..... $19.95
230MB (SYQ 230MB) ..... $29.95
200MB (SYQ SQ2000) ..... $59.95

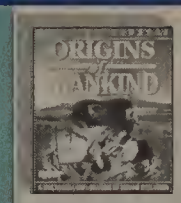
### Software • Software • Software • Software • Software • Software • Software

**7th Level**
*Monty Python's Complete Waste of Time*
**$36.95**

*MechWarrior 2* ..... $46.95
*Zark Nemesis: Forbidden Lands* .... $49.95
*Bad Mojo* ..... $46.95
*Spycraft* ..... $46.95
*Shanghai Great Moments* ..... $26.95
*Beginning To Read* .... $12.95
*Total Distortion* ..... $34.95
*Wandering with William and Rosie* $34.95

**Access**
*Links Pro CD*
**$39.95**

*Marathon 2: Durandal* $44.95
*Kid Pix Studio* ..... $34.95
*MYST & Book* ..... $49.95
*MathBlaster Jr.* ..... $29.95
*Warcraft II- Tides of Darkness* .... $46.95
*Nine Worlds, hosted by Patrick Stewart* ..... $29.95
*Mac Golf Pack* ..... $24.95
*Top Ten Pack II* ..... $29.95
*Descent II* ..... $49.95



**Maxis**
*Origins of Mankind*
**$29.95**

*Star Trek: Judgement Rites Special Edition* ..... $34.95
*Tommy Interactive Adventure Then & New* ..... $34.95
*Dig* ..... $34.95
*X-Wing Collector's Ed.* $24.95
*Chessmaster 3000* .... $34.95
*Critical Mass* ..... $34.95
*Bob Dylan, Highway 61 Interactive* ..... $34.95
*Sim City 2000 Sp. Ed.* $44.95

**Memorex**
*Bug Explorers*
**$24.95**

*Sim Isle* ..... $29.95
*1996 U.S. Olympic Team* ..... $24.95
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*Space Quest 6* ..... $24.95
*Victor Vector and Yondo in the Lost Dinosaur Egg* ..... $2.95
*Paws* ..... $19.95
*Flight Unlimited* ..... $49.95
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### MICROPOLIS

We are the #1 source for Micropolis Drives! Ask about our low price guarantee.

**2 Gig**

**SCSI $389** **SCSI A/V $445**

#MC4421, 5400RPM, 9ms access, 5 year warranty

| | | |
|---|---|---|
| 2 Gig | 7200RPM | $539 |
| | AV | $595 |
| | Wide | $630 |
| | Wide A/V | $689 |
| 4 Gig | 7200RPM | $809 |
| | AV | $899 |
| | Wide | $899 |
| | Wide A/V | $979 |
| 9 Gig | 5400RPM | $1579 |
| | AV | $1699 |
| | Wide | $1679 |
| | Wide A/V | $1799 |
| 9 Gig | 7200RPM | $1799 |
| NEW 3 1/2" | Wide | $1859 |

### Quantum

| | | |
|---|---|---|
| 2 Gig | 7200RPM | $639 |
| | Wide | $649 |
| 4 Gig | 7200RPM | $900 |
| | Wide | $919 |

### • CD Recorder •

**2X Write 4X Read $575**

**4X Write 4X Read $949**

Includes Toast CD Mastering Software

### • 10X CD ROM •

**Int $179 Ext $249**

### • 2.6 Gig Optical •

**$1569**

**2.6 Gig disks 1-4$70 5-9$65 10+$60**

### • 4 Gig Tape •

**$429**

**Includes backup software for Mac, Win 3.1, Win 95, OS/2, & Warp, 1 FREE Tape**

### • 4-8 Gig DAT •

Sony SDT7000

**$899**

**90MB/min transfer rate!**

**Includes backup software for Mac, Win 3.1, Win 95, OS/2, & Warp, 1 FREE Tape**

### iomega

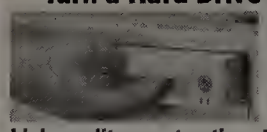
Drives include **1 FREE cartridge.**

| | |
|---|---|
| **100MB Zip** | **$189** |
| **1Gig Jaz internal** | **$379** |
| **1Gig Jaz external** | **$439** |
| **1Gig Jaz external** (iomega case) | **$469** |

**100MB Zip disks 2-4 $20 5-9 $17 10+ $15**

**1Gig Jaz disks 2-4 $99 5-9 $95 10+ $90**

### Turn a Hard Drive Into a Removable



**Converts any 3 1/2" hard drive into a removable drive. Great for transportability, data interchange, or security needs. Extremely high quality construction. Metal cartridge and frame, cooling fan. Unit has SCSI ID select on the cartridge. Qty discounts available.**

| | System | Extra Cartridge | Extra Frame |
|---|---|---|---|
| SCSI | $85 | $40 | $54 |
| WIDE SCSI | $129 | $64 | $75 |

**Weather resistant case to store and transport cartridge $55**

## • CD ROM DRIVES •

All CD Drives include external drive, cable, & driver software.

| | | | |
|---|---|---|---|
| NEC | 4X | 200ms | $159 |
| Teac | 6X | 160ms | $219 |
| Plextor | 6X | 145ms | $349 |
| Philips | 8X | 195ms | $279 |
| NEC | 8X | 145ms | $279 |
| Toshiba | 8X | 145ms | $369 |
| Plextor | 8X | 115ms | $409 |
| Pioneer | 10X | 140ms | $249 |

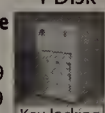
**Special Bundle Offer!** Buy any CD Drive and any Hard drive at the same time and take $10 off the total price!

**CD ROM CHANGERS**

| | | | | | |
|---|---|---|---|---|---|
| Pioneer | 4.4X | DRM-624X | 6 Disk | 190ms | $359 |
| Nakamichi | 8X | MJ48S | 4 Disk | 300ms | $589 |

**CD ROM TOWERS**

| | | 4 Drive | 7 Drive |
|---|---|---|---|
| NEC | 4X | $759 | $1259 |
| Plextor | 4.5X | $1499 | $2529 |
| Teac | 6X | $1439 | $2439 |
| Plextor | 6X | $1699 | $2899 |
| Philips | 8X | $1459 | $2499 |
| NEC | 8X | $1559 | $2629 |
| Plextor | 8X | $2299 | $3999 |
| Nakamichi | 8X | $2899 (16 discs) | $4899 (28 discs) |



Key locking case, Ext SCSI ID selects, dual 65w pr sp. optional

Ext SCSI ID select switches 300w pr sp.

## • OPTICAL DRIVES •

All prices below include external drive, cable, driver software, and **1 FREE cartridge.**

| | | |
|---|---|---|
| 230MB | For PowerBook | $399 |
| 230MB | Smart Storage | $399 |
| 640MB | Fujitsu (230MB backwards compatible) | $589 |
| 650MB | PD ROM combination optical & 4XCD | $539 |
| 2.6Gig | Pinnacle Micro | $1399 |
| 2.6Gig | Maxoptix | $1799 |
| 2.6Gig | Hewlett Packard | $2225 |

## • REMOVABLES •

MCD

New 540MB MCD drive is backwards compatible with SyQuest 270MB media.

**540MB $289 external**

SyQuest

SyQuest drives include **1 FREE cartridge.**

**135MB external $139 200MB int/ext $399/$459**

**230MB external $289 270MB int/ext $179/$239**

## • SCSI CONTROLLERS •

***Save $10 when you purchase any SCSI controller with any SCSI drive.***

**ADAPTEC**

| | |
|---|---|
| A2940MUW PCI, supports Ultra Wide SCSI, 15 Wide SCSI devices | $299 |

**ATTO**

| | |
|---|---|
| NuBus, Bus Mastering, 15 Wide SCSI devices | $589 |
| PCI, Bus Mastering, 15 Wide SCSI devices | $319 |
| PCI, Bus Mastering, Twin Channel, 30 Wide SCSI devices | $829 |

## • RAID SOLUTIONS •

Remus RAIDsoftware by Trillium Research

| | |
|---|---|
| Remus RAID 0 or 1 software | $229 |
| Remus Lite RAID 0,1,4, or 5 software | $349 |

MegaHaus stocks a wide variety of RAID solutions from top manufacturers; Adaptec, DPT, Raidtec, Stream Logic (formerly Micropolis Radion), Remus, and Tekram. Call for a quote.

*We custom build RAID systems - including hot swappable solutions.*

## • SCSI HARD DRIVES •

| SCSI | Speed | RPM | Brand | Model | Wty | Int | Ext |
|---|---|---|---|---|---|---|---|
| 1050MB | 9ms | 5400 | Seagate | ST31055N | 3 | $345 | $405 |
| 2147MB | 9ms | 5400 | Seagate | ST32155N | 5 | $489 | $549 |
| 2147MB | 8ms | 7200 | Seagate | ST32550N | 5 | $729 | $789 |
| 4290M8 | 8ms | 7200 | Seagate | ST15150N | 5 | $999 | $1059 |
| 9080M8 | 11ms | 5400 | Seagate | ST410800N | 5 | $1749 | $1849 |
| **WIDE SCSI** | | | | | | | |
| 2150M8 | 9ms | 5400 | Seagate | ST32155W | 5 | $559 | $689 |
| 2147M8 | 8ms | 7200 | Seagate | ST32550W | 5 | $789 | $919 |
| 4294MB | 8ms | 7200 | Seagate | ST15150W | 5 | $1099 | $1229 |
| 9080M8 | 11ms | 5400 | Seagate | ST410800W | 5 | $2029 | $2219 |

## • IDE HARD DRIVES •

| IDE | Speed | RPM | Brand | Model | Wty | Price |
|---|---|---|---|---|---|---|
| 1080MB | 11ms | 4500 | Fujitsu | M1614T | 3 | $165 |
| 1280MB | 12ms | 5400 | Quantum | FB1280A | 3 | $198 |
| 1700MB | 11ms | 4500 | Quantum | SR31700A | 3 | $218 |
| 2167MB | 10ms | 5400 | Seagate | ST32140A | 3 | $269 |
| 2500MB | 11ms | 4500 | Quantum | SR32550A | 3 | $299 |
| 3254MB | 10ms | 4500 | Quantum | TM33200A | 3 | $345 |
| **2 1/2"** | | | | | | |
| 540MB | 13ms | 4200 | Toshiba | MK1924FC | 1 | $229 |
| 810MB | 13ms | 4200 | Toshiba | MK1926FC | 1 | $299 |
| 1350MB | 13ms | 4200 | Toshiba | MK2720FC | 1 | $479 |
| 2100MB | 13ms | 4200 | Toshiba | MK2101MAN | 1 | $649 |

## • SCSI TAPE DRIVES •

All Tape Drives include external drive, cable, NovaMac software, & **1 FREE tape.**

| | | | |
|---|---|---|---|
| 2Gig | Seagate | QIC | $419 |
| 2Gig | HP | DAT | $709 |
| 2-4Gig | HP | DAT | $829 |
| 2-4Gig | Seagate | DAT | $789 |
| 4Gig | Seagate | QIC | $489 |
| 4-8Gig | Sony | DAT | $989 |
| 4-8Gig | Seagate | DAT | $989 |
| 4-8Gig | HP | DAT | $1129 |
| 7-14Gig | ExaByte | 8mm | $1169 |
| 15-30Gig | Quantum | DLT | $2659 |

**30Gig Quantum DLT Only $2659**

**Desktape** **$289**

*Allows you to mount most tape drives as a normal drive on the desktop.*

## • MEDIA SALE •

| Optical | 2-4 | 5+ |
|---|---|---|
| 128MB, 3.5", 512K | $17 | $13 |
| 230MB, 3.5", 512K | $18 | $14 |
| 540MB, 3.5", 512K | $35 | $31 |
| 640MB, 3.5", 2048K | $38 | $34 |
| 600MB, 5.25", 512K | $38 | $34 |
| 650MB, 5.25", 1024K | $38 | $34 |
| 1.2GB, 5.25", 512K | $49 | $45 |
| 1.3GB, 5.25", 1024K | $49 | $45 |
| 2.3GB, 5.25", 512K | $70 | $65 |
| 2.6GB, 5.25", 1024K | $70 | $65 |

**Nomai**

**SyQuest Compatible Cartridges**

**88MB $37**

**200MB $57**

**270MB $47**

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Nov 1996 MacWorld



Circle 245 on reader service card

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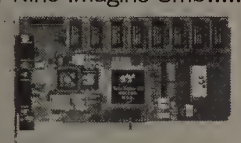
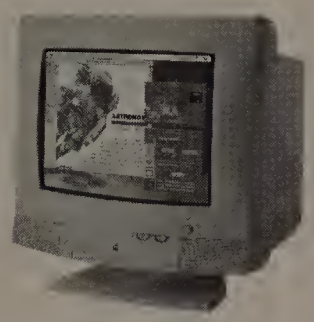
ATI Xclaim 4mb VRAM .....369
IMS TwinTurbo 4mb/8mb....479/629
Number Nine Imagine 4mb.....669
Number Nine Imagine 8mb.....899





Apple 1705 17".....759
Apple 1710 17".....1049
Apple Multiscan 20" .....1699
DiamondPro 21TX.....1725
Orchestra Multi 14" .....249
Orchestra Multi 17" .....669
RasterOps MC17.....779
RasterOps MC21 HR .....1881
Sony SFII Trinitron 17" .....859
Sony SFII Trinitron 20".....1799

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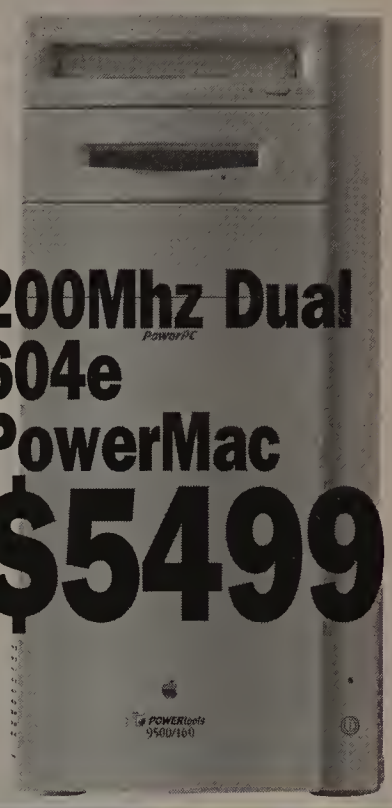

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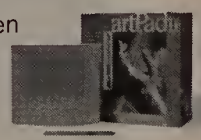

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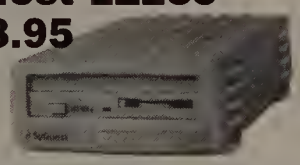

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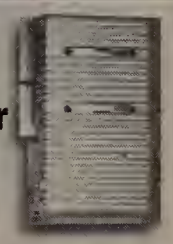

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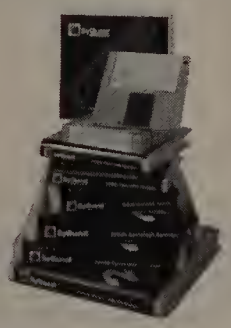

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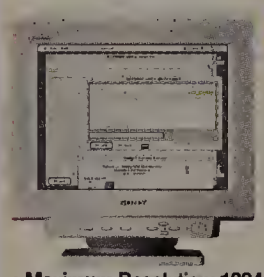

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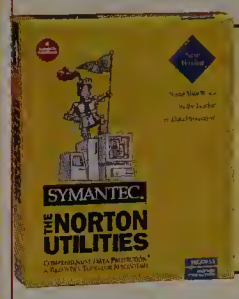


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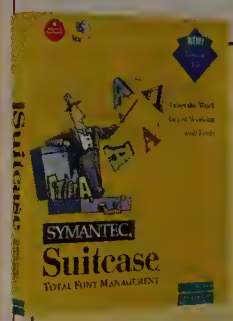


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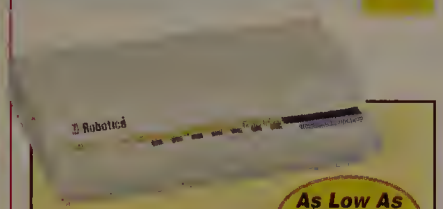

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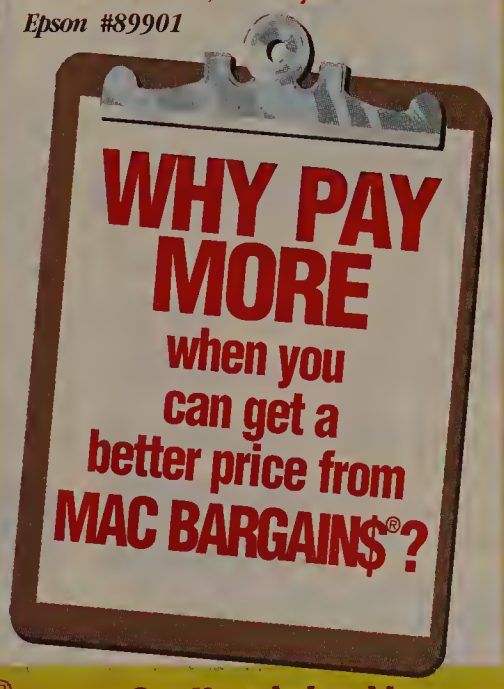


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All drives come preformatted with FWB for Maximum performance in AV and DTP environments
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Fast & Wide
$475 Int $585 Ext

**4.3 GB ULTRA XP**
• 8 ms Seek • 7200 RPM
• 512KBuffer • 5Yr.War.
• MR Head Technology
All drives come preformatted with FWB for Maximum performance in AV and DTP environments
$789 Int $859 Ext
Fast & Wide
$889 Int $989 Ext

## Seagate

| | | | |
|---|---|---|---|
| 1080 GB Hawk 2 XL Ultra SCSI | 11 ms Seek 5400 RPM 512KBuffer 5 Year Warranty | $389 | $330 |
| 1080 GB ST51080N | 11 ms Seek 5400 RPM 256 KBuffer 5 Year Warranty | 245 | 305 |
| 2.4 GB ST32155 Ultra SCSI | 9 ms Seek 5400 RPM 512K Buffer 5 Year Warranty | 535 | 595 |
| 2.5 GB BARRACUDA 2 | 8 ms Seek 7200 RPM 512K Buffer 5Year Warranty | 695 | 755 |
| 4.3 GB BARRACUDA 4 | 8 ms Seek 7200 RPM 1024K Buffer 5 Year Warranty | 1025 | 1085 |
| 2.5 GB F & W BARRACUDA 2 | 8 ms Seek 7200 RPM 512 KBuffer 5 Year Warranty | 735 | 835 |
| 4.3 GB F & W BARRACUDA 4 | 8 ms Seek 7200 RPM 1024K Buffer 5 Year Warranty | 1095 | 1195 |
| 9.0 GB ELITE | 11 ms Seek 5400 RPM 1024 Buffer 5 Year Warranty | 1845 | 1945 |
| 9.0 GB F & W ELITE | 11 ms Seek 5400 RPM 1024 Buffer 5 Year Warranty | 1975 | 2075 |

## CONNER

| | | | |
|---|---|---|---|
| 2.1 GB | C21075 8 ms Seek 7200 RPM 512K Buffe r5Year Warranty | 645 | 705 |
| 4.3 GB | C4207 8 ms Seek 7200 RPM 512K Buffer 5Year Warranty | 855 | 915 |
| 4.3 GB | C4207Wide 8 ms Seek 7200 RPM 512K Buffer 5Year Warranty | 955 | 1055 |

## Quantum

| | | | |
|---|---|---|---|
| 420MB TRAILBLAZER | 14 ms Seek 4500 RPM 128K Buffer 2 Year Warranty | $120 Int | $170 Ext |
| 540 MB FIREBALL | 9 ms Seek 5400 RPM 512K Buffer 5 Year Warranty | 155 | 215 |
| 850 MB TRAILBLAZER | 14 ms Seek 4500 RPM 128K Buffer 3 Year Warranty | 185 | 245 |
| 1080 MB ATLAS | 8ms Seek 7200RPM 1024K Buffer 5 Year Warranty | 269 | 329 |
| 1280 MB TEMPEST | 10.5 ms Seek 4500 RPM 128K Buffer 5 Year Warranty | 245 | 315 |
| 2.1 GB TEMPEST | 10.5 ms Seek 4500 RPM 128K Buffer 5 Year Warranty | 375 | 505 |
| 3.2 GB TEMPEST | 10.5 ms Seek 4500 RPM 128K Buffer 5 Year Warranty | 445 | 505 |
| 2.0 GB ATLAS | 8ms Seek 7200 RPM 1024K Buffer5 Year Warranty | 595 | 655 |
| 4.3 GB ATLAS | 7.9ms Seek 7200 RPM 2048K Buffer 5 Year Warranty | 855 | 935 |

### Fast & Wide SCSI AV Drives

| | | | |
|---|---|---|---|
| 2.0 GB ATLAS | 8ms Seek 7200 RPM 1024K Buffer5 Year Warranty | 655 | 755 |
| 4.3 GB ATLAS | 7.9ms Seek 7200 RPM 2048K Buffer 5 Year Warranty | 935 | 1035 |

## SCSI ACCELERATORS/RAID BUNDLES

MW EDITORS' CHOICE ATTO — SCSI Accelerators

**Express PCI** Ultra SCSI $345
Single channel RISC based PCI to Fast/Wide SCSI 3 accelerator card for Apple's PCI based computers.

**Dual Channel Express PCI** Ultro SCSI $595
Dual channel RISC based PCI to Fast/Wide SCSI 3 accelerator card for Apple's PCI based computers. Transfer up to 40 MB/Sec.

**Silicon Express 2** $425
SCSI 1 & 2 support, transfer rates up to 10.0 MB/sec.,supports multiple block sizes,takes advantage of parallel processing capability.Ideal for graphic design, multimedia applications and More!

**Silicon Express 4** $795
Fast/Wide 16 BIT SCSI 2 accelerator card for Apple's Nubus based computers.

FWB

**FWB JackHammer** $445
Fast/Wide 16BIT SCSI 2 accelerator card for Apple's Nubus based computers. Supports fast/wide SCSI 2 (16 Bit) transfer rates up to 20MB/sec. and fast SCSI 2 (B Bit) transfer rates up to 10 MB/sec. Full 16 Bit wide support for the latest drives and disk arrays.

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adaptec

**PowerDomain 2940 UWM** $285

**PowerDomain 2940 OUW** ULTRA SCSI
The PowerDomoin 2940 supports the lotest Fost, Wide, and Ultro SCSI Devices to enhonce overall system performance

## DIGITAL TAPE BACKUP

### Quantum DIGITAL LINEAR TAPE

**SPEED & VALUE**
DLT2000XT 30GB
Transfers 150MB Per Minute
Only $2575

**MASSIVE STORAGE**
DLT4000 40GB
Transfers 180MB/Minute
Only $4495

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DLT 2500XT 150 GB
Transfers 180MB/Minute
Only $5500

**WOW! 280 GB**
DLT4700 280GB
Transfers 180MB/Minute
Only $Call

| | | |
|---|---|---|
| 4GB Conner TRAVANQIC™ Only | | $485 Ext. |
| 8GB Conner DAT DDS-2,SCSI2, 60MB/min, | | $875 |
| 8GB DAT Hewlett Packard DDS-2 C1533 SCSI2, 60MB/min., | | $1065 |
| 8 GB DATSony 7000 SCSI2, 90 MB Per Minute | | $1295 |
| 24-48GB Hewlett Packard Auto Tape Loader HP1553, 60MB/min., 4mm media | | $2995 |

Exabyte

| Capacity | Model | | MediaInt. | Ext. |
|---|---|---|---|---|
| 2-5GB | 8205XL | 8mm | $1395 | $1485 |
| 5-7GB | 8505XL | 8mm | $2065 | $1485 |
| 14GB | 8700 | 8mm | $1419 | $1479 |

## MEDIA

### TAPE CARTRIDGES

| | |
|---|---|
| 60 M DAT | $9.95 |
| 90 M DAT | $14.95 |
| 120M DAT | $19.95 |
| 112 M Exabyte | $13.95 |
| 160 M Exabyte | $19.95 |
| DLT 20GB | $42.95 |
| DLT 30GB | $55.95 |
| DLT 40 GB | $99.99 |

All media carry a 5 Year Warranty!

### REMOVABLES

| | |
|---|---|
| 44 MB | $38 |
| 88 MB | 42 |
| 135 MB | 19 |
| 200 MB | 66 |
| 270 MB | 54 |
| 135 MB | 17 |
| 230 MB | 28 |
| Zip | 19 |
| Jaz | 97 |

All media carry a 5 Year Warranty!

## CABLES

| | |
|---|---|
| 50/50 Centronics | $15 |
| 50 Centronics/68 F&W | $45 |
| 68/68 Fast & Wide | $45 |
| 68 Pin Active Terminator | $25 |
| 50 Pin Centronic Terminator | $10 |

## RAID SOFTWARE

REMUS — High-speed, reliable data storage software for the Mac

Remus Raid Software combines multiple hard drives into o disk orroy, providing greater speed for disk intensive opplicotions such as lesktop publishing and digital video. Remus oftware also offers data protection, keeping our criticol doto sofe from drive failures.

| | |
|---|---|
| Remus Striping | $195 |
| Remus Raid Level 5 | $295 |

## ATTO

| | |
|---|---|
| Express Stripe PCI | $195 |
| Express Stripe Nubus | $195 |
| Express Mirror PCI | $185 |
| Express Mirror Nubus | $179 |

ProDirect, Inc. 10830 Nesbitt Ave S.
Bloomington, MN 55437

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Circle 135 on reader service card

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# iomega Jaz Drive 1.0GB

Includes One 1.0GB Cartridge!

$499.95
I040 1014

**iomega Jaz Cartridges**

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$199.95
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* Manufacturers Mail-in Rebate

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**Incredibly Low Price**

**7200 RPM • 1024K CACHE**

# 4.3GB

Internal Atlas C104 0005

$899

# Quantum

| Capacity | Model | Access | Part No. | Internal | Part No. | External |
|---|---|---|---|---|---|---|
| 1280MB | Tempest | 12ms | C104 0015 | $299 | C104 0065 | $359 |
| 2150MB | Tempest | 10.5ms | C104 0013 | $399 | C104 0063 | $459 |
| 3255MB | Tempest | 10.5ms | C104 0014 | $499 | C104 0064 | $559 |
| 4300MB | Atlas | 8.6ms BEST BUY | C104 0005 | $899 | C104 0055 | $959 |

# 540MB BLOWOUT

IBM

ClubMac brings you the 540MB Deskstar SCSI drive from IBM. With great performance and a THREE year warranty this drive is an outstanding value.

$139

- 4500 RPM
- 12BK Buffer
- 12ms Access

Backed by ClubMac's 30 DAY Money Back Guarantee

Manufacturer's 3 Year Warranty

| | Internal | Price | External | Price |
|---|---|---|---|---|
| 540MB | C104 1002 | $139 | C104 1052 | $19 |
| 2.1GB | C104 1001 | $399 | C104 1051 | $45 |

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# CLUBMAC 4.4X-SPEED CD-ROM

$149

# 4.4X

Mac OS COMPATIBLE

30 DAY

C104 1700

CharisMac Engineering CD AutoCache

PhotoCD

C104 1700 ClubMac 4X CD-ROM Drive.....$149
C104 1750 ClubMac 8X CD-ROM Drive.....$229
N024 1070 NEC MultiSpin 4Xc 7 Disc Changer.....$339

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C104 0901

$429

Mac OS COMPATIBLE

TWO Year Warranty

BUNDLED WITH Retrospect v3.0 Backup Software

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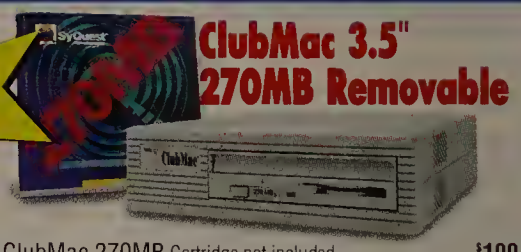
C104 1303 4-8 GB CompressionDAT.....$879
C104 1302 4-8 GB PerformanceDAT.....$999

## CLUBMAC REMOVABLE STORAGE

$199

C104 1802



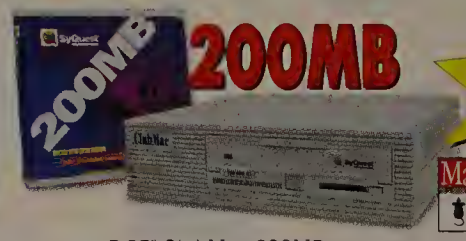
# ClubMac 3.5" 270MB Removable

C104 1802 3.5" ClubMac 270MB Cartridge not included.....$199

# 200MB

$389

C104 1801



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C104 1801 5.25" ClubMac 200MB Cartridge not included.....$389

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REMOVABL TECHNOLOG

30 DAY

Mac OS COMPATI

$299

S198 2002

FREE CARTRIDGE

# 230M

S198 2002 EZ Flyer 230MB Drive with cartridge.....$2

### GENUINE SYQUEST CARTRIDGES

| Part Number | Media | Qty 1 | Qty 10 | Qty 20 | Part Number | Media | Qty 1 | Qty 10 | Qty 2 |
|---|---|---|---|---|---|---|---|---|---|
| S198 1013 | 105MB | $35ea | $34ea | $33ea | S198 1010 | 44MB | $40ea | $39ea | $38e |
| S198 1014 | 270MB | $57ea | $56ea | $55ea | S198 1011 | 88MB | $44ea | $43ea | $42e |
| S198 2011 | 230MB | $30ea | $29.50ea | $29ea | S198 1012 | 200MB | $69ea | $68ea | $67e |

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- .30mm Dot Pitch
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| 016 1032 | PrecisionView 21 21", 1600x1200 | $2399 |
| 016 104 | PressView 21SR 21", 1600x1200 | $3299 |

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| 053 1031 | SuperScan MC20 20", 1600x1200 | $1395 |
| 053 1032 | SuperScan MC21 21", 1600x1200 | $1899 |

**EC**

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| 026 1036 | NEC M500 15", 1024x768 | $449* |
| 026 1031 | NEC 15" XV15+ 15", 1024x768 | $469 |
| 026 1032 | NEC 17" XV17+ 17", 1024x768 | $749 |
| 026 1037 | NEC M700 17", 1024x768 | $799 |

*After $50 end user rebate.

**ONY**

| | | |
|---|---|---|
| 106 1021 | Sony Multiscan 15SXII 15", 1024x768 | $399 |
| 106 1018 | Sony Multiscan 17SFII 17", 1024x768 | $799 |

**IAG INNOVISION**

| | | |
|---|---|---|
| 156 1012 | Technitron DX700T 17", 1024x768 | $725 |

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**EPSON Stylus COLOR Pro** — $379

E047 1019

MACWORLD MW★★★★

PANTONE CALIBRATED

2 WARRANTY

- Incredible 720 dpi color printing, optimized with special coated paper
- Pantone Matching
- Postscript upgradeable
- 2 Year Limited Warranty
- True block laser quality text
- Cross-platform compatibility
- Print speed up to3ppm, color 1ppm

**PSON**

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| 047 1031 | Epson Stylus 500 | $279 |
| 047 1019 | Epson Stylus Pro | $379 |
| 047 1022 | Epson Stylus Pro XL | $1799 |

**EWLETT PACKARD**

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| 047 1067 | HP DeskWriter 680C Color InkJet | $319 |
| 047 1076 | HP DeskJet 870CXI Color InkJet | $499 |
| 047 1030 | HP LaserJet 5MP Printer | $1045 |

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**TelePort Platinum Internet Edition** — $169*

*Best-Selling 28.8K fax/modem*

***Now with complete Internet Solution***

Includes:
- Web browser
- E-mail
- Internet Access Software

5 Year Manufacturer's Warranty

Accelerated for Power Macintosh

G050 1016

**LOBAL VILLAGE**

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|---|---|---|
| 050 1022 | TelePort Platinum 28.8 data (Internet Ed) | $169† |
| 050 1019 | PowerPort Platinum PC Pro 28.8/10BT | $449†† |

†Price after $30.00 mail-in rebate, good from 7/1/96 - 9/30/96.
††Price after $50.00 mail-in rebate, good from 7/1/96 - 9/30/96.

**EST DATA**

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|---|---|---|
| 020 1001 | 2834FLXMAC 28.8 v.34 Fax/Modem | $109* |

*After $20.00 mail-in rebate.

**.S. ROBOTICS**

| | | |
|---|---|---|
| 020 1025 | 28.8 Sportster Voice for Mac 36.6 data | $179* |
| 020 1021 | 28.8 Sportster for Mac 33.6 data | $149* |

*After $20 00 mail-in rebate.

## SCANNERS

**AGFA Arcus II** — $1995

A055 1001

1 Year Manufacturer's Warranty

- Single pass, High speed scanner
- 36-bit color scanning
- 600 x 1200 dpi resolution
- Transparency Module
- Includes: Adobe Photoshop, AGFA FotoLook scanning software Fototune LE for color management

**AGFA**

| | | |
|---|---|---|
| A055 1022 | Agfa SnapScan for MAC 600DPI 24-Bit | $365 |
| A055 1011 | Agfa StudioScan IIsi | $699 |
| A055 1015 | Agfa StudioStar LE w/PhotoShop LE | $825 |
| A055 1017 | Agfa StudioStar w/PhotoShop full | $975 |
| A055 1001 | Agfa Arcus II Desktop Pro Scanner | $1995 |

**UMAX**

| | | |
|---|---|---|
| U010 1061 | Vista S6E w/PhotoDeluxe | $399 |
| U010 1052 | Powerlook II w/transparency adapter | $1995 |

**EPSON**

| | | |
|---|---|---|
| E045 1013 | ES1000C LE-MAC Color Scanner | $599 |

**RELISYS**

| | | |
|---|---|---|
| R060 1016 | Scorpio (e-Desk, OmniPage LE) | $369 |
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V029 1008

FREE SCSI adapter with purchase of Paperport VX! Call for details.

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## DIGITAL CAMERAS

**Kodak DC20 Digital Camera** — $329

Kodak digital science SOLUTIONS

*Comes with Free Koi's PowerGoo Software from MetoTools!*

K043 1003

1 Year Manufacturer's Warranty

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|---|---|---|
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| K043 1002 | Kodak DC50 Zoom Camera | $999 |

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**radius VideoVision Studio 2.5.1** — $1599

With VideoVision Studio, you can record full-screen, full-motion, 60 field-per-second digital video input and output to and from your hard disk. VideoVision Delivers unsurpassed real-time hardware-accelerated JPEG compression and decompression of each individual video frame, so you can perform non-linear, frame-accurate digital video editing. VideoVision Studio also digitizes stereo audio simultaneously and stores it with the video for easier input and editing.

R013 1018

| | | |
|---|---|---|
| R013 1018 | VideoVision Studio 2.5.1 (Nubus) | $1599 |
| R013 1079 | VideoVision Studio 2.0 (PCI) | $3795 |

## MAC OS SYSTEMS

**PowerComputing PowerTowerPro™ 225** — $4995*

P512 1001

- 225MHz PowerPC 604e Processor
- Upgradeable CPU Card
- Dual Processor Support
- Up to 1GB Memory
- AV Capable Hard Drive
- Ultra SCSI/RAID Options
- 8X CD ROM Drive
- 1MB Level 2 Cache included
- 8MB 128-Bit Graphics Accelerator
- 6PCI Slots
- 9 Drive Bays
- Interleaved Memory
- Dual SCSI, Fast Internal 10M8/se.

score card MacWEEK ◆◆◆◆◆ — MacUser ★★★★★

*Monitor sold separately

| | | |
|---|---|---|
| P512 1001 | PowerTowerPro 225 225MHz 604e, 16MB RAM, 2GB HD, 8X CD, 8MB VRAM | $4995* |
| P512 1002 | PowerTowerPro 200 200MHz 604e, 16MB RAM, 2GB HD, 8X CD, 8MB VRAM | $4495* |
| P512 1003 | PowerTowerPro 180 180MHz 604e, 16MB RAM, 2GB HD, 8X CD, 8MB VRAM | $4195* |
| P512 1004 | PowerTower 200e 200MHz 604e, 16MB RAM, 2GB HD, 8X CD, 2MB VRAM | $3595* |
| P512 1005 | PowerTower 180e 180MHz 604e, 16MB RAM, 2GB HD, 8X CD, 2MB VRAM | $3295* |

**UMAX Computer Corporation SuperMac S900** — Starting at $2995*

U012 1001

Multi-Processor Upgradeable!

150MHz PowerPC

1 Year Manufacturer's Warranty

*Monitor sold separately

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|---|---|---|
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| U012 1002 | SuperMac S900L 150MHZ 604, 16MB RAM, 2GB HD, 128 IMS Video Card, 6.7x CD | $3695* |
| U012 1006 | SuperMac S900L 180MHZ 604e, 32MB RAM, 2.1GB HD, IMS Video Card 4MB, 8x CD | $3995* |
| U012 1010 | SuperMac S900L DP (2)180MHZ 604e's, 32MB RAM, 2.1GB HD, IMS Video Card 4MB, 8x CD | $4695* |
| U012 1007 | SuperMac S900L 200MHZ 604e, 32MB RAM, 2.1GB HD, IMS Video Card 4MB, 8x CD | $4295* |

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**WACOM ARTZ II 6"x 8" Graphics Tablet** — $298

W010 1028

LIFETIME LIMITED WARRANTY

30 DAY MONEY BACK GUARANTEE

*Edit images, paint, draw and develop your technique to create stunning art with a new Wacom Graphics tablet!*

**WACOM**

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|---|---|---|
| W010 1026 | ArtPad II 4x5 | $139 |
| W010 1027 | ArtPad II 4x5 w/Dabbler | $149 |
| W010 1028 | ArtZ II 6x8 | $298 |
| W010 1029 | ArtZ II 12x12 | $425 |
| W010 1030 | ArtZ II 12x18 | $695 |

**CALCOMP**

| | | |
|---|---|---|
| C290 1010 | DrawingSlate II II 4x5 w/Dabbler | $99 |
| C290 1002 | DrawingSlate II II 6x9 | $205 |
| C290 1001 | DrawingSlate II II 12x12 | $229 |
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## WOW! 3GB FOR THE PRICE OF 2GB!

### GET 3GB HIGH PERFORMANCE STORAGE FOR THE PRICE OF MANY 2GB DRIVES!

NOW AVAILABLE!

GREAT PRICE

**$499.95** Internal configuration Quantum

### APS Q 3200

- ✔ 3GB for the price of 2GB
- ✔ 4500 rpm mechanism – Ultra SCSI interface
- ✔ Transfers up to 4.47MB/sec.

POWER MATCHED FOR POWER PC

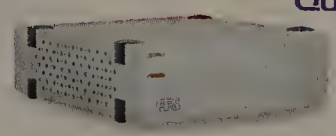
It's like getting an additional gigabyte for FREE. The new APS Q 3200 is priced lower than some 2GB SCSI drives, yet it delivers an 3000MB of reliable storage. The drive uses MR heads and an advanced PRML read channel to fit its 3GB into a 3.5" low profile Ultra SCSI drive.

### 2GB STORAGE FOR ONLY

### APS Q 2100

**$399.95** Internal configuration Quantum

- ✔ Reliable 4500 rpm Ultra SCSI mechanism
- ✔ MR heads and PRML read channel
- ✔ Exceptional value among 2GB drives
- ✔ 3-year warranty



Give your Mac the extra storage space it needs by adding the new APS Q 2100. At only 20¢ per MB for an internal configuration, the APS Q 2100 is the value leader among 2GB SCSI drives. Its transfer rates are a great match with most applications, and it's backed by a 3-year warranty.

### 1.2GB OF STORAGE FOR ONLY

### APS Q 1280

**$249.95** Internal configuration Quantum

- ✔ 4500 rpm mechanism
- ✔ High areal density and PRML read channel
- ✔ Ultra SCSI interface – Works in SCSI or Ultra SCSI environments
- ✔ 3-year warranty

POWER MATCHED FOR POWER PC

Finally there's a hard drive that combines the reliability of a 4500 rpm mechanism with outstanding performance. The APS Q 1280 uses MR heads, PRML and Ultra SCSI technology for exceptional performance. It is backed by a 3-year warranty.

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- The powerful, easy-to-use telephone manager for your Mac
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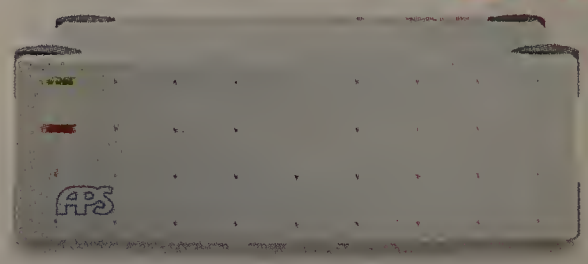
### INCREDIBLE! 7200 RPM PERFORMANCE, 5400 RPM PRICE!

### APS MS 2000

**$399.95** Internal configuration MICROPOLIS

- ✔ 7.31MB/sec. sust. write, 4.54MB/sec. sust. read
- ✔ 5400 rpm mechanism
- ✔ 5-year warranty



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This incredible drive has the performance you might expect from a 7200 rpm mechanism but with a 5400 rpm price – and reliability! The APS MS 2000 formats to 2047MB, delivers sustained reads at up to 4.54MB/sec. and sustained writes at up to 7.31MB/sec, has an average access time of 20 ms and average seek of 9.6 ms.

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| 102415 | NOMAI 540 cartridge | 59.95 |
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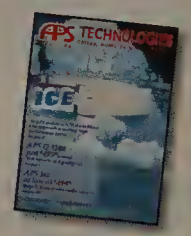
*Then call 816-920-4150 from a fax machine with a handset or fax modem and follow the instructions.*



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# FOUR TIMES BETTER THAN AN 8X CD-ROM!

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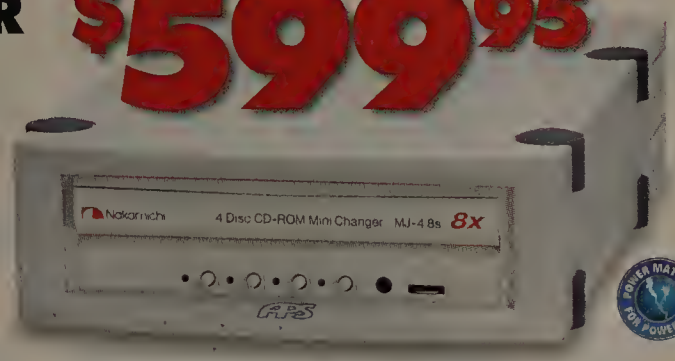


Meet your needs for larger CD-ROM storage capacity with the new APS CD Changer. It is a four-disk CD-ROM changer which operates at 8X speeds, making it an excellent match with high-end multimedia and data archiving applications. The APS CD Changer incorporates a half-height mechanism which switches discs at the click of a mouse and uses a safe tray-less loading and unloading design.

## STEAL THIS 8X CD-ROM DRIVE!

## APS CD8 $229.95 Slimline enclosure*

SR 2000 $299.95

- ✔ High performance 8X CD-ROM drive
- ✔ Great for home and office CD-ROM use

8X

*Does not include DaTerm®

The 8X performance of the new APS CD-8 supercharges any CD-ROM application! Its speed enhances multimedia AND business CDs. At this incredibly low price, you can hardly afford to live with that old 2x or 4x CD ROM drive.

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SR 1000 enclosure as pictured

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- ✔ Up to 217MB of reliable optical storage
- ✔ 256KB cache buffer delivers great performance
- ✔ Available in AC-only portable or SR 2000 enclosure

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- ✔ 4GB native capacity!
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MacUser ZD LABS 4½ MacWEEK

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| APS Q 3200 Quantum Fireball TM | 3200MB | 499.95 | 599.95 |

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| APS MS 2000 Micropolis 4421 | 2000MB | 399.95 | 499.95 |
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| APS ProDAT® DDS-2 Non Compression Mech. | 4GB | $649.95 | 699.95 |
| APS HyperDAT® DDS-2 Compression Mech. | 8GB | 849.95 | 899.95 |
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| APS CD Changer | 4 Disc CD changer | | 599.95 |
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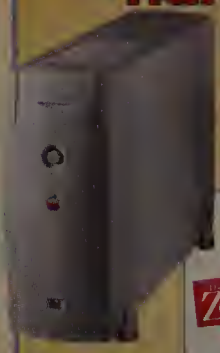

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- Includes **3** cartridges!

MacWeek

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- Unplug and go for convenient data transport.

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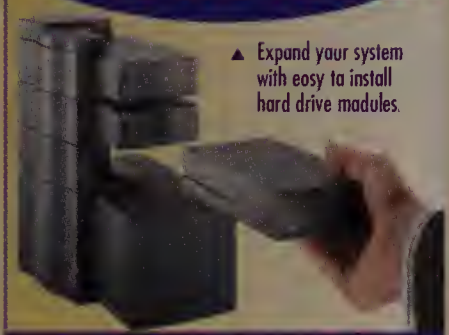
| 2.1GB Quantum Fireball TM | 3 yr. warr. | $659 |
| 3.2GB Quantum Fireball TM | 3 yr. warr. | $759 |

## tower Joule drives



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| 3.2GB Quantum Fireball TM | 3 yr. warr. | $759 |
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| DAT 90m | $9 ea. | $8 ea. |
| DAT 120m | $25 ea. | $24 ea. |
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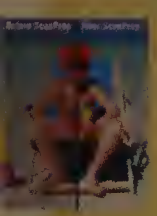

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"ScanPrep is an essential application if you own a scanner... the sort of program that has to be seen to be believed." **Ben Long – MacWeek**
Highest Possible Rating ◆◆◆◆◆

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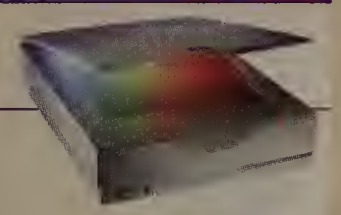

**Silverscanner PRO with Photoshop LE**
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- Photoshop LE
- ScanPrep
- Silverscan

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**Silverscanner DTP**
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- Silverscan
- ScanPrep

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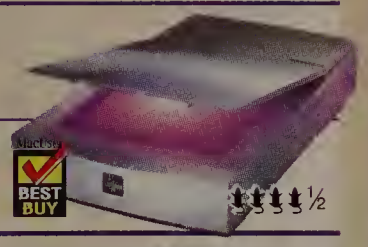

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- ScanPrep
- Silverscan

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- ScanPrep

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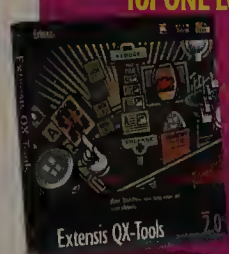


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Zip Disks: item # MED 0165

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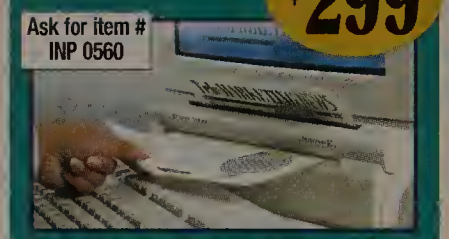

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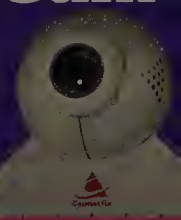

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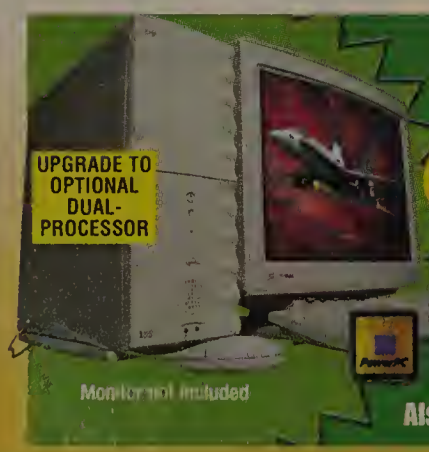

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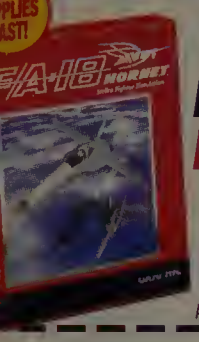

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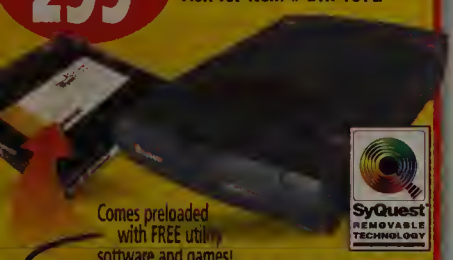

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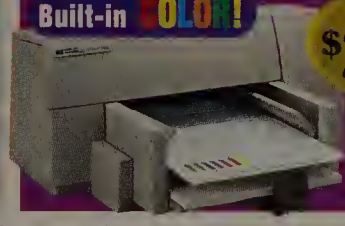

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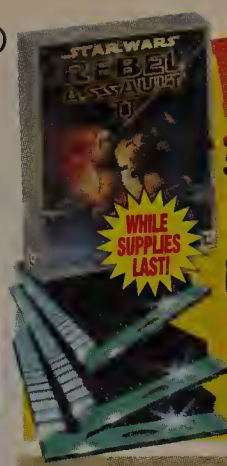

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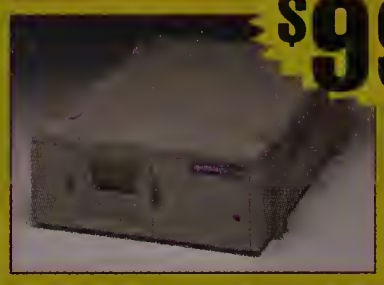

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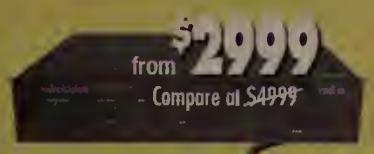


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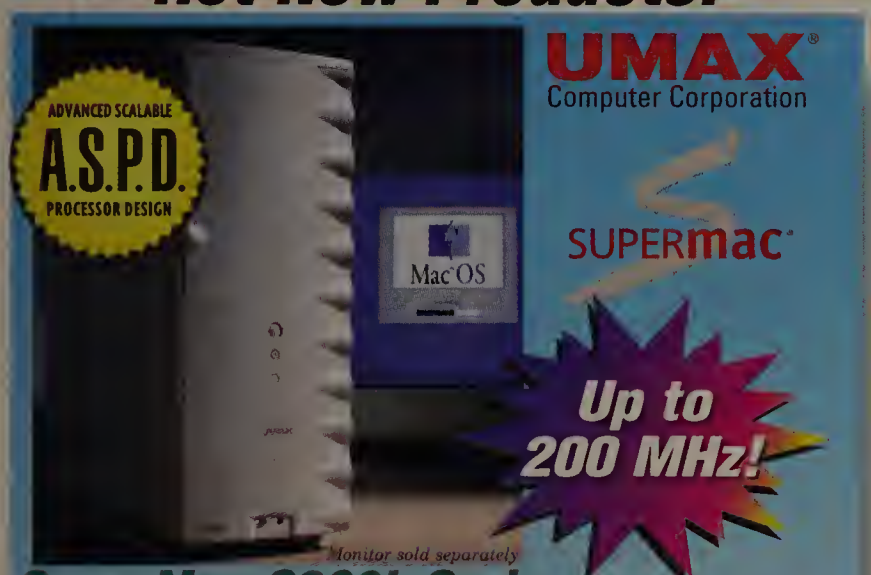


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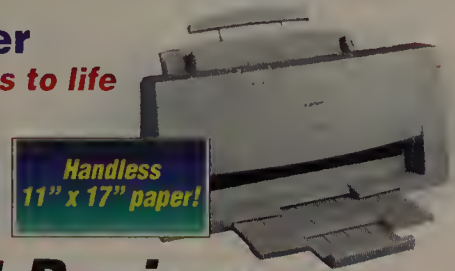


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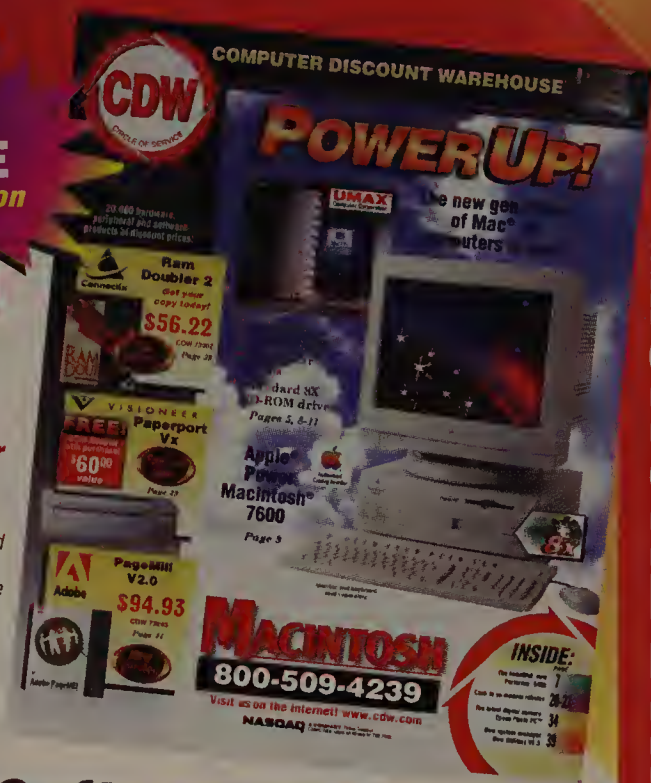


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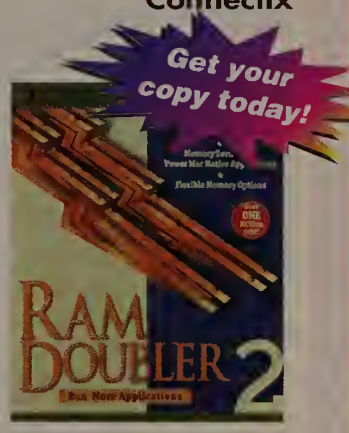


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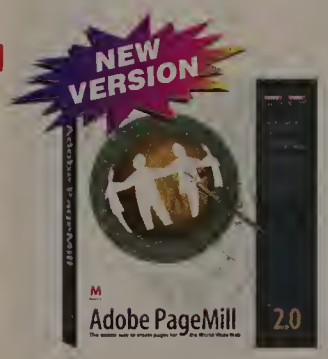


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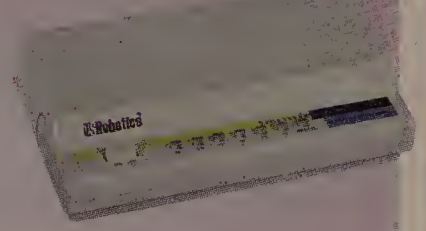

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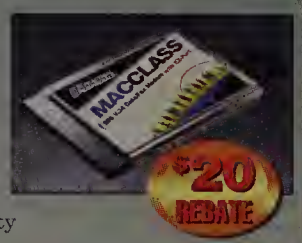


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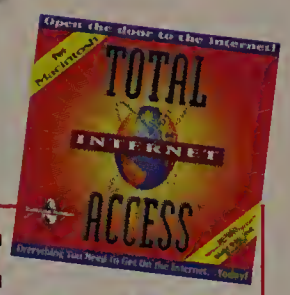


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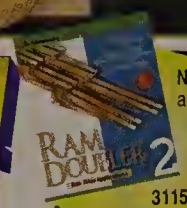

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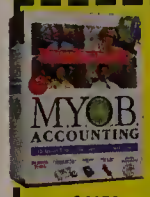

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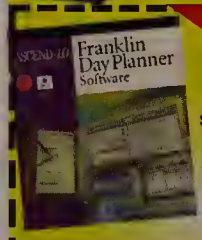

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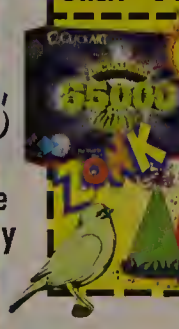

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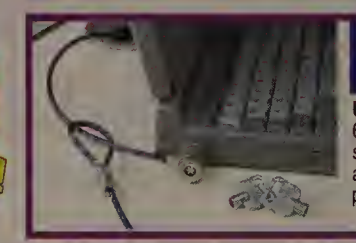

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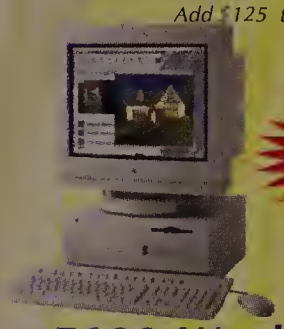

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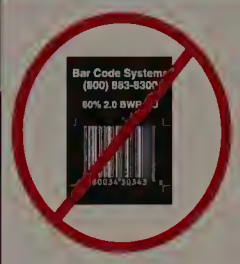

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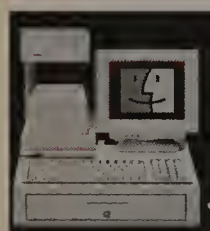

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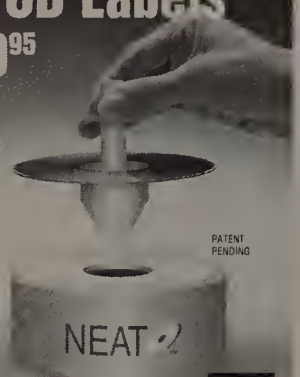


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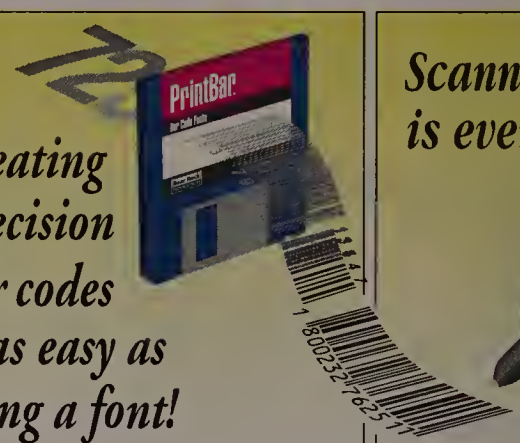


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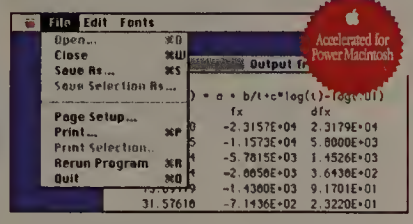


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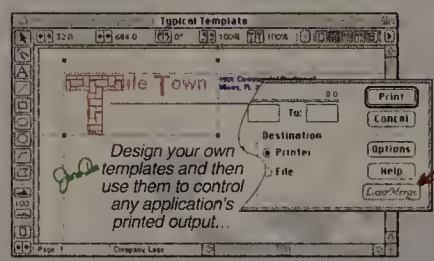


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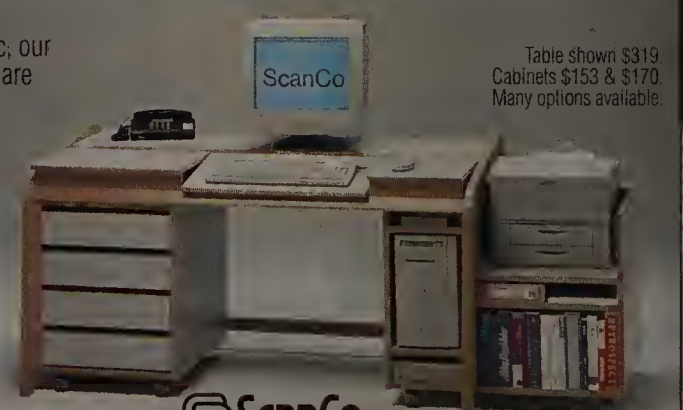


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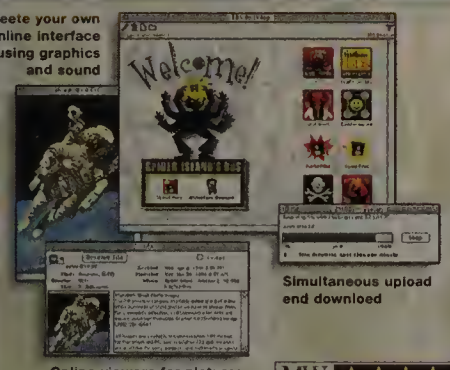


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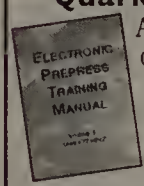


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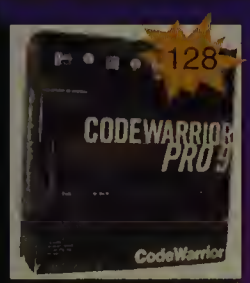


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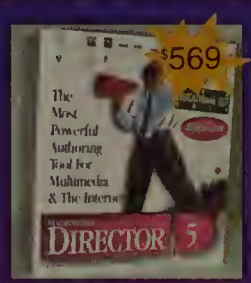


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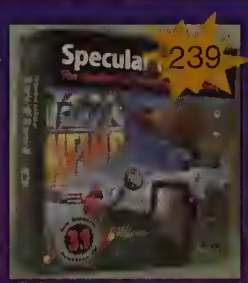


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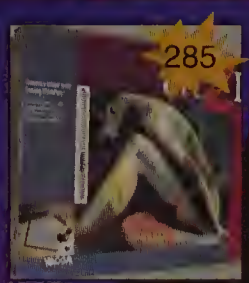

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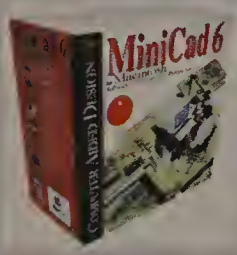

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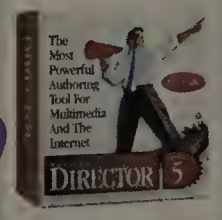

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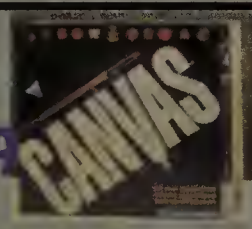

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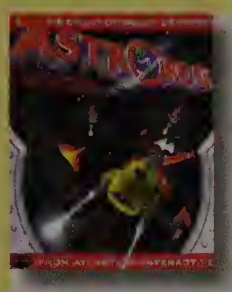

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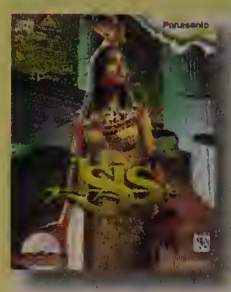

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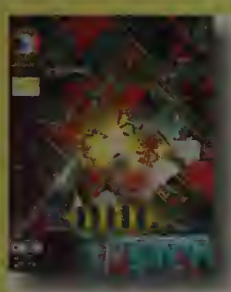

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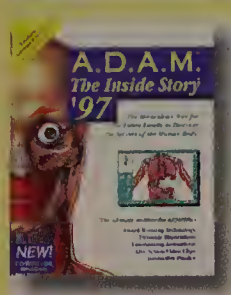

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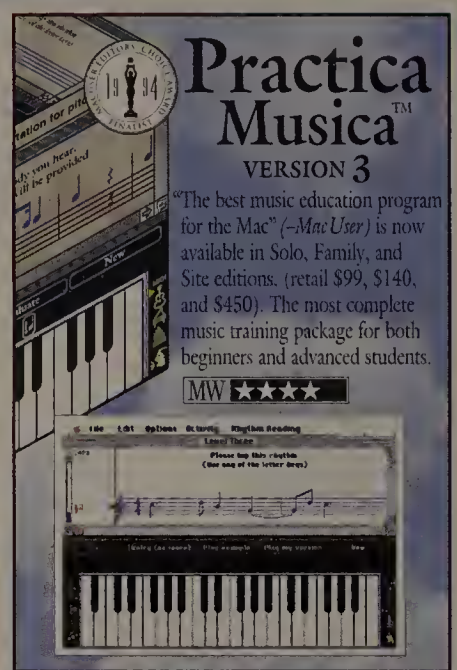

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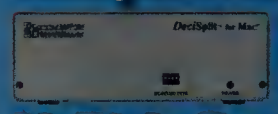

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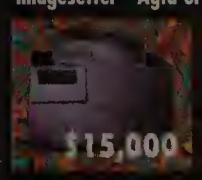


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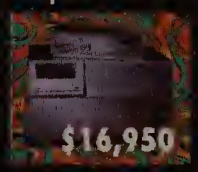


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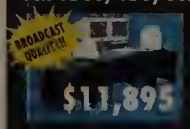


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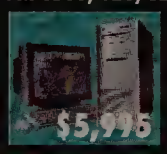


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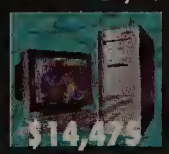


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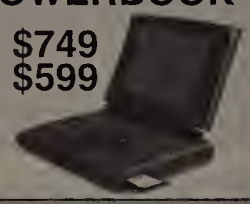

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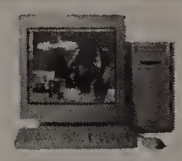

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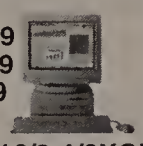

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| 8500/180 | 32/2GB/CD | 4099 |
| 9500/200 | 32/2GB/CD | 4459 |
| 9500/180MP | 32/2G/CD | 4189 |

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| 190CS/66 | 8/500 | 1279 |
| 5300CS | 8/500 | 1839 |
| 5300CS | 16/750 | 2289 |
| 5300C | 16/750 | 2699 |
| 5300CE | 32/1.1 | 3889 |
| 2300C | 8/750 | 2269 |
| 2300C | 20/1.1/ MDM | 3098 |

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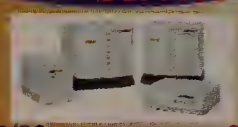
| 6220CD | 16/1GB/CD/KB | 999* |
| 5320/120 | 16/1GB/CD/15" | 1889 |
| 6200CD | 8/1G/15"/MDM | 1549 |
| 6290CD | 8/1G/14"/MDM | 1749 |
| 6300CD | 8/1.2/14"/MDM | 1599 |
| 6300CD | 16/1.2/15/MDM | 2069 |
| 6320CD | 16/1.2/15/MDM | 2099 |
| 6400/180 | 16/1.6/8XCD | 2239 |
| 6400/200 | 16/2.4/8XCD | 2599 |

## WorkGroup® Servers



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|---|---|---|
| 6150/66 | 16/1.2/INTRNT | 2099 |
| 9150/120 | 16/2GB/CD | 2799 |
| 9150/120 | 16/2GB/AShr | 3199 |
| 7250/120 | 16/1.2GB/CD | 2525 |
| 7250/120 | 16/1.2/INRNT | 2888 |
| 7250/120 | 16/1GB/CD/AS | 3235 |
| 8550/132 | 24/2GB/INRNT | 5059 |
| 8550/132 | 24/2GB/CD/AS | 5439 |
| 8550/132 | 24/2G/CD/DAT | 5749 |
| 8550/132 | 24/2GB/DAT/AS | 6429 |
| 500/132 | 32/CD/BASE | 6959 |
| 500/132 | 32/2GB/DAT/CD | 8689 |
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| LsrWrtr 300 w/toner | 429 |
| LsrWrtr 320 w/toner | 539 |
| LsrWrtr 12/640Ps (New) | 1499 |
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| 20SF2 20" .30DP | 1589 |
| 20SE2T 20" .25DP | 1829 |
| GDM-2000CT New! | 3099 |

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| XE 17/XP 17 | 989/1039 |
| XE 21/XP 21 | 1679/1939 |

## Apple® Monitors

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| MS 14" Ref/14" | 229*/289 |
| MS 15" Ref/15" | 279*/389 |
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| MS 1710AV | 939 |
| MS 20" | 1799 |

## SyQest

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|---|---|
| Ez 135 | 109 |
| 88 w/cart | 319 |
| 200 w/cart | 379 |
| 270 w/cart | 359 |

## Hard Disk

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|---|---|
| 500 Ext | 169 |
| 1GB Ext | 309 |
| 2GB Ext | 409 |
| 4GB Ext | 929 |

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| TIPrt Pltm | 165 |
| Pltnm PC | 269 |
| Pltnm Pro | 409 |
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|---|---|
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| 130 | 729 |
| 2/4 MB | 99/176 |
| ToolKit | 269 |

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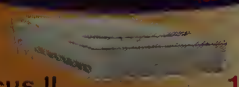
| ES-1000C | 789 |
| ES-1200C PRO-MAC | 1099 |
| Stylus Color Pro | 439 |
| Stylus Color Pro XL | 1689 |

## AGFA



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|---|---|
| Arcus II | 1729 |
| StudioScan IIsi | CALL |

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|---|---|
| DeskJet 855CXI | 419 |
| DeskJet 870CXi | 484 |
| DeskJet 340 MAC | 318 |
| DeskJet 1600CM | 1889 |
| LaserJet 5MP | 969 |
| LaserJet 4M+ | 1839 |
| LaserJet 4MV | 2689 |
| LaserJet 5M New! | 1729 |
| Color LaserJet 5M | 6945 |
| LaserJet 5SI MX | 3729 |
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| 5900L 16/2GB/8CD/IMS | 3459 |

SCANNER

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|---|---|
| UMAX S6E | 358 |
| S12 LE/ PROii | 709/799 |

## MICROTEK

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| ScnMkr E6 | 547 |
| ScnMkr 31 | 929 |

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| AZ II 6X8 | 298 |
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| #51602 | 16MB DIMM | $109 |
| #59258 | 32MB DIMM | $199 |
| #58946 | 64MB DIMM | $399 |
| #50336 | 4MB SIMM | $45 |
| #57259 | 8MB SIMM | $65 |
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| 5300c | 16/750 | #20485 | $2999 |
| 5300cs | 16/500 | #20482 | $2255 |
| 5300cs | 24/750 | #20481 | $2749 |
| 5300 | 8/500 | #20257 | $1399 |
| 190cs | 24/500 | #25600 | $1499 |

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$1749
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| #89268 | 1705 | $695 |
| #82367 | 1710 | $899 |
| #82369 | 1710AV | $949 |
| #82370 | 20" | $1895 |

## SONY

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| [illegible] | 17" SF II Color | $799 |
| [illegible] | 20" SF II Color | $1795 |
| [illegible] | 1000CT | $3095 |

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|---|---|---|
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| [illegible] | PressView 17SR | $1892 |
| [illegible] | PressionView 21 | $2195 |
| [illegible] | PressView 21SR | $3395 |

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Apple Ext.II Keyboard
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#49659 2.6Gig Optical $call
VerBatim 1.3GB Cart. 5pk $269
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| #65126 | Laser Writer 12/640 | $1499 |
| #65487 | StyleWriter 2500 | $369 |
| #65480 | StyleWriter 1500 | $269 |

## CPU's ONLY

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| 7600/132/CD 32MB RAM/1.6GB | #25681 | $2885 |
| 8500/150/CD 48MB RAM/2GIG HD | #25670 | $3295 |

## CPU's ONLY

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| 9500/150/CD 64MB RAM/4GIG HD | #26991 | $4349 |
| 9500/180/CD 64MB RAM/4GIG HD | #22097 | $5995 |

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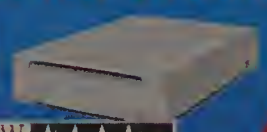

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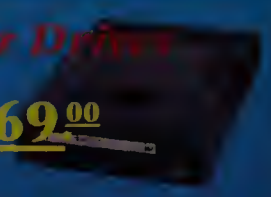

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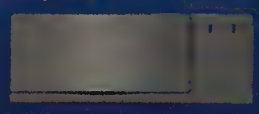

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| 9500/150 | 16/2GB/4XCD | 3825 | 128 |
| 9500/132 | 16/2GB/4XCD | 3095 | 103 |
| 8500/180 | 32/2GB/8XCD | 4299 | 150 |
| 8500/150 | 16/2GB/8XCD | 3199 | 112 |
| 8500/132 | 16/1.2GB/4XCD | 2599 | 98 |
| 8500/120 | 16/1GB/CD | 2499 | 94 |
| 8500/120 | 16/2GB/CD | 2699 | 102 |
| 7600/132 | 16/1.2GB/8XCD | 2795 | 105 |
| 7600/120 | 16/1.2GB/4XCD | 2395 | 86 |
| 7500/100 | 16/500MB/4XCD | 1949 | 73 |
| 7500/100 | 16/1GB/4XCD | 2125 | 80 |
| 7200/120 | 16/1.2GB/8XCD | 2179 | 73 |
| 7200/120 | 16/1.2GB/4XCD | 1975 | 71 |
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| 7250/120 | 16/1.2GB/4XCD/W.S. | 2439 | 88 |
| 8550/132 | 24/2GB/4XCD/Datt | 6989 | 245 |
| 8550/132 | 24/2GB/4XCD/I.S. | 5589 | 195 |
| 500/132 | 32/2GB/4XCD/Datt | 9499 | 332 |
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| 5300CS | 16/750 | CALL | |
| 5300C | 8/500 | CALL | |
| 5300C | 16/750 | CALL | |
| 5300CE | 32/1GB | 3895 | 130 |
| DUO2300C | 8/750 | 2395 | 86 |
| DUO2300C | 20/1GB/Mod | 3375 | 113 |
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| 6205/75 | 8/1GB/4XCD | 1750 | 63 |
| 6290/100 | 8/1.2GB/4XCD | 1695 | 61 |
| 6300/100 | 16/1.2GB/4XCD | 1995 | 72 |
| 6320/120 | 16/1.2GB/4XCD | 2049 | 74 |
| 6320/120 | Apple TV Card | 249 | |
| 6400/180 | 16/1.2GB/8XCD | 2499 | 90 |
| 6420/200 | 16/2.4GB/8XCD | 2799 | 101 |

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| Kodak | DC-20 | 310 |
| Kodak | DC-50 | 899 |

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| Apple | 600I Quad Speed | 149 |
| Apple | 600I or 300I Mounting Kit | 25 |
| NEC | Multispin 6XE Mac | 499 |
| Seven Bay | CD ROM Tower | 1399 |

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| Phillips | CDD-200 CDR | $ 999/1069 |
| Pinnacle | RCD1000 2X w/ Toast & 2 CD's | 650 |
| Yamaha | 400 CDR | 1149/1249 |
| Sony | 2x CDR w/ Toast | 999/1069 |

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| Fujitsu | Dynamo 230 | $ 489 |
| Fujitsu | Dynamo 230 Powerbook | CALL |
| Pinnacle | Vertex 2.6GB | 1339 |
| Syq 200/2GB HD/4GB Datt Multifunct. | | 1799 |
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| ATI | Exclaim 2mb Videocard | 269 |
| ATI | Exclaim 4mb Videocard | 379 |
| IMS | Twin Turbo 4mb V-card | 515 |
| IMS | Twin Turbo 8mb V-card | 920 |
| Matrox | Millennium 4mb V-card | 379 |
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| Apple | Multiscan 1710 | 869 |
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| Apple | Multiscan 20" | 1779 |
| Hitachi | Superscan MC 17" | 875 |
| Hitachi | Superscan MC 20" | 1345 |
| Hitachi | Superscan MC 21" | 1775 |
| Hitachi | Superscan MC 21" HR | 1975 |
| Mitsubishi | Diamond Pro 21TX | 1775 |
| NEC | XV15+ 15" | 469 |
| NEC | XV17+ 17" | 799 |
| NEC | XE21 21" | 1649 |
| NEC | XP21 21" | 1965 |
| Radius | Precisionview 21" | 2265 |
| Radius | Pressview 21" HR | 3115 |
| Sony | CPD15SF2 15" | 469 |
| Sony | CPD17SF2 17" | 799 |
| Sony | GDM20SF2 20" | 1649 |
| Viewsonic | 17GA (AV) 17" | 699 |
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| Apple | GeoPort Telecom Kit | $ 118 |
| Global Village | Teleport Platinum 28.8 | 189 |
| Global Village | PowerPort PC Card | 325 |
| Global Village | Platinum Pro PC Card | 469 |
| Megahertz | Cruise Card 28.8 | 289 |
| Megahertz | Cruise Card 28.8-Cellular | 289 |
| Motorola | Bit Surfer 28.8 | 359 |
| Supra | Express Modem 28.8 | 155 |
| Supra | Fax Modem 28.8 | 199 |
| Supra | Sonic 33.6 v.34 | 279 |
| U.S. Robotics | Mac & Fax Sportster 28.8 | 199 |
| U.S. Robotics | Sportster 28.8 w/ Voicemail | 199 |

| PRINTERS | | |
|---|---|---|
| Apple | StyleWriter 1200 | $ 145 |
| Apple | StyleWriter 1500 | 219 |
| Apple | Color StyleWtr 2200 | 259 |
| Apple | StyleWriter 2500 | 345 |
| Apple | LaserWriter Select 320 | 449 |
| Apple | LaserWriter 4/600 PS | 699 |
| Apple | LaserWriter 12/640 | 1499 |
| Apple | LW 12/600PS/Color | 4995 |
| Epson | Stylus Pro | 445 |
| Epson | Stylus Pro XL (11X17) | 1715 |
| HP | DeskJet 855 XI | 499 |
| HP | DeskJet 855 SE | 509 |
| HP | LaserJet 5MP | 999 |
| HP | LaserJet 5M | 1799 |
| HP | LaserJet 4MPlus | 1599 |
| HP | LaserJet 4MV (11x17) | 2765 |
| **HARD DRIVES** | | |
| **INTERNAL:** | | |
| Conner | 1.0GB 3.5" | $ 259 |
| Quantum | 1.2GB Fireball 3.5" | 294 |
| Quantum | 2.0GB Saturn 3.5" | 459 |
| Quantum | 3.2GB Fireball 3.5" | 399 |
| **EXTERNAL** | | |
| Conner | 1.0GB 3.5" | $ 320 |
| Quantum | 1.2GB Fireball 3.5" | 339 |
| Quantum | 2.0GB Saturn 3.5" | 520 |
| Quantum | 3.2GB Fireball 3.5" | 469 |
| Iomega | Zip Drive | 189 |
| Iomega | Jazz Drive | 469 |
| Syquest | EZ-135 Drive | 125 |
| Syquest | EZ-Flyer 230MB Drive | 295 |
| **Scanners** | | |
| AGFA | Arcus II | $ 1745 |
| AGFA | StudioScan IIsi | 675 |
| AGFA | StudioStar | 949 |
| AGFA | Duo Scan | 4925 |
| Epson | ES-1200C LE | 925 |
| Epson | ES-1200C Mac Pro | 1090 |
| Microtek | Scanmaker E3 | 359 |
| Microtek | Scanmaker E6 Pro Mac | 825 |
| Umax | VistaS6E Mac | 395 |
| Umax | VistaS6E Pro Mac | 595 |
| Umax | VistaS12 Mac | 759 |
| Umax | VistaS12 Mac Deluxe | 849 |
| Umax | Powerlook II | 2175 |
| Umax | Page Office | 225 |
| Visoneer | Paperport VX | 279 |
| Visoneer | Paperport | 149 |
| **DOS CARDS** | | |
| Apple | Pentium 100Mhz | $ 1049 |
| Apple | Pentium 100Mhz (Pull) | 849 |
| Apple | 586 100Mhz | 699 |
| Apple | 6100 Series | 149 |
| **CALIBRATION** | | |
| Lightsoure | Colortron II | $ 1125 |
| Lightsoure | Spotlight | 1539 |

### MEMORY SALE!

| | | |
|---|---|---|
| 4MB | Simms 72 Pin | $ 30 |
| 8MB | Simms 72 Pin | 50 |
| 16MB | Simms 72 Pin | 199 |
| 32MB | Simms 72 Pin | 216 |
| 8MB | Dimms | 75 |
| 16MB | Dimms | 119 |
| 32MB | Dimms | 229 |
| 64MB | Dimms | 449 |
| 8MB | Powerbook 5300/190 | 129 |
| 16MB | Powerbook 5300/190 | 249 |
| 32MB | Powerbook 5300/190 | 469 |
| 48MB | Powerbook 5300/190 | 519 |
| 1MB | VRAM | 45 |
| 256K | L2 CACHE | 79 |
| 512K | L2 CACHE | 139 |

### LEASE SPECIALS

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**9500/200mhz Workstation Package**
**Power Macintosh 9500/200mhz**
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8500/180 Mhz
8500/150 Mhz

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|---|---|
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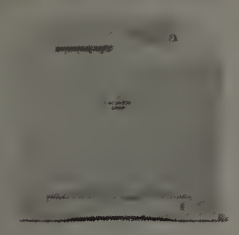
| 8500/150 16/2gb/cd | 2995 |
| 8500/132 16/1gb/cd | 2595 |
| 7200/120 8/1gb/cd | Call |
| 7200/120 16/1gb/cd/dos | 2295 |
| 7600/120 16/1gb/cd | Call |
| 8500/120 16/1GB/CD | 2595 |
| 9500/132 16/1GB/CD | Call |
| 6100/66 8/500/CD | Call |
| 7100/80 8/500/CD | Call |
| 7200/75 8/500/CD | Call |
| 7200/90 16/500/CD | Call |
| 586/100 PCI dos card | 775 |
| Pentium/100 dos card | 975 |

## Apple Printers



| | |
|---|---|
| Port. Stylewriter 2200 | Call |
| Stylewriter 1500 | 279 |
| Stylewriter 2500 | 379 |
| Laserwtr 4/600 PS | 845 |
| Laserwriter 12/640 | 1499 |
| Duplex Option 12/640 | 379 |
| Col. Laserwtr 12/600 | Call |

## Performas

| | |
|---|---|
| 631CD/60 8/250 | Call |
| 5215CD/75 8/1gb | Call |
| 6300/100 CD | Call |
| 6320CD | Call |

## Powerbooks

| | |
|---|---|
| 190CS/66 8/500 | Call |
| 5300CS/100 8/500 | Call |
| 5300CS/100 16/750 | Call |
| 5300C/100 8/500 | Call |
| 5300C/100 16/750 | Call |
| 5300CE/117 32/1GB | Call |
| Duo 2300C 8/750 | 2699 |
| Duo 2300C 20/1.1/M | 3599 |
| Upgrade Duo 2xx-2300 | 1269 |
| Duo Dock Plus | Call |
| Duo Floppy | 139 |
| Duo Floppy Adaptor | 126 |

## Network Servers

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|---|---|
| 500/132 32/2g/cd/dat | Call |
| 500/132 32/0/cd | Call |
| 700/150 48/4g/cd/dat | Call |
| 700/150 32/1gb/cd | Call |

## Workgoup Server

| | |
|---|---|
| 7250 16/1.2g/cd/AS | 3175 |
| 7250 16/1.2g/cd/inet | 2795 |
| 7250 16/1.2/cd | 2375 |
| 8550 24/2g/cd/Inet | 4949 |
| 8550 24/2g/cd/AS | 5349 |
| 8550 24/2gb/cd/dat | 5595 |

## Apple Monitors

| | |
|---|---|
| Multiscan 15" | Call |
| Multiscan 14" | 259 |
| Multiplescan 1705 | Call |
| Applevision 1710 | Call |
| AppleVision 1710AV | Call |
| Multiplescan 20" | 1799 |

## IMS

| | |
|---|---|
| Twin Turbo 2MB | 369 |
| Twin Turbo 4MB | 535 |
| Twin Turbo 8MB | 959 |

## HP

| | |
|---|---|
| Deskjet 340CM | 325 |
| Deskwriter 680C | 325 |
| Deskjet 855Cse | 449 |
| Deskjet 870Cse | Call |
| Laserjet 5MP | 999 |
| Laserjet 5M | 1695 |
| Deskjet 1600CM | 1869 |
| Copyjet-M (2 in 1) | 2799 |
| Laser 4MV 11x17 | 2679 |
| **Laser 5SiMX** | **3699** |
| **Color Laserjet 5M** | **Call** |
| Scanjet 4C | 919 |
| Sacnjet 4P | 499 |
| Scanjet 4S | 299 |

## Epson

| | |
|---|---|
| ES-1000C | 719 |
| ES-1200C | 919 |
| ES-1200C Pro | 1095 |
| Clr. Stylus IIS | 199 |
| Clr. Stylus II | 299 |
| Clr. Stylus Pro | 379 |
| Clr. Stylus Pro XL | 1699 |
| Postscript option | 229 |
| Postscript option XL | 269 |

## Sony

| | |
|---|---|
| 15 SF2 | 479 |
| 15SX1 | 399 |
| 17SF2 | 779 |
| GDM 17SE2T | 995 |
| GDM 20SF2 | 1639 |
| MS 20TC | 3179 |
| CMO-R540-40 2.6GB | 2150 |

## Microtek

| | |
|---|---|
| Scanmaker E3 | 379 |
| Scanmaker E6 | 559 |
| Scanmaker E6 Pro | 775 |
| Scanmaker III | 1745 |
| Scanmaker II HR | 589 |

## Kodak

| | |
|---|---|
| DC 50 digital camera | Call |
| DC 60 digital camera | Call |
| Photo CD | Call |

## Radius

| | |
|---|---|
| Pressview 17SR | 1849 |
| Intellicolor 20E | 1975 |
| Multiview 21" | 1679 |
| Precisionview 21 | 2195 |
| Pressview 21SR | 2999 |
| Full page gray scale | 499 |
| Precesioncolor 24/1600 | Call |
| Videovision 2.0 PCI | 3399 |
| Two Page Display 20 GS | 825 |

## NEC

| | |
|---|---|
| XV15+/XV17+ | 479/769 |
| XP17 | 1025 |
| XE 21 | 1669 |
| XP 21 | 1939 |
| C 400 14" | 299 |
| C 500 15" | 389 |
| M 500 15" | 519 |
| M 700 17" | 839 |
| Multispin 4xc ext. | 339 |

## Viewsonic

| | |
|---|---|
| 17EA Multimedia 17" | 655 |
| 17GA 17" | 729 |
| 20G 20" | 1199 |
| 21PS 21" | 1595 |
| 15GS 15" | 395 |
| 15ES 15" | 359 |
| 14ES 14" | 279 |
| P 810 21" | 1599 |
| P815 21" | 1879 |

## Truevision

| | |
|---|---|
| Targa 1000 | 2479 |
| Targa 1000 Pro | 2699 |
| Targa 2000 | 3699 |

## Number 9

| | |
|---|---|
| Imagine 4MB | 649 |
| Imagine 8MB | 995 |

## Umax

| | |
|---|---|
| Powerlook II | 2069 |
| Powerlook II Pro | 2245 |
| Vista S-12 LE | 739 |
| Vista S-12 pro | 839 |
| Vista S6E | 399 |
| S6E-LE2 | 495 |
| S6E Pro | 595 |
| Gemini D-16 | Call |
| Supermac S900D | 2799 |
| Supermac S900L | 3699 |

## Agfa

| | |
|---|---|
| Studio scan II Si | 879 |
| Arcus II | 1759 |
| DualScan | Call |
| Transparency Unit | 375 |

## Nikon

| | |
|---|---|
| Coolscan LS10E | 995 |
| ScanTouch AX 1200 | 859 |
| **Super Coolscan 9290** | **1859** |

## Accessories

| | |
|---|---|
| Zip Drive | 189 |
| Jazz Drive | 529 |
| EZ 135 MB Syquest | Call |
| 44/88MB Cartridge | Call |
| Panasonic kxl-D745 Cd | 499 |
| Teleport Platinum | 195 |
| Pinnacle RCD-5040 | 1099 |
| ARTZ 6X8 | 299 |
| 2GB Internal HD | 395 |
| 4GB Internal HD | 899 |

## Memory

| | |
|---|---|
| 8MB/16MB DIMM | 79/149 |
| 32/64MB DIMM | 249/495 |
| PB 8/16 MB | 149/249 |
| PB 32/48MB | 399/625 |

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| 9500 132/80-1GB | 3190 |
| 9500 120/16-1GB | 2290 |
| 8500 80-2GB | 3490 |
| 8500 150 16-2GB-CD | 3090 |
| 8500 132Mhz | 2550 |
| 7600 132 | 2775 |
| *Call For 150 & 180 Mhz* | |
| 7600 16-1GB-CD | 2250 |
| 7200 75/8-500 | 999 |

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## Powerbooks

| | |
|---|---|
| 5300CE 32-1Gb | $ 3790 |
| 5300c 16-1GB | 2875 |
| 5300cs 8-500 | 1790 |
| 5300cs 16/1GB | 2550 |
| 5300 8-500 | 1179 |
| *5300C 16/750* | *$2590* |

### Demo Powerbooks

| | |
|---|---|
| PB 180c Color | 895 |
| 540C / 540 | CALL |
| 520 4-240 | 785 |
| *180c Color* | *895* |

## Upgrades

| | |
|---|---|
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| Prf 63X to 6300 603-100Mhz | CALL |
| 7200/ 75 to 120 Mhz | 429 |
| 7200/ 90 to 120 Mhz | 379 |
| 7200 To 7600 120 | 1075 |
| 8100 to 8500/132Mhz | 1590 |
| 8100 to 8500/120Mhz | 1325 |
| Upgrade to 150 or180 Mhz | CALL |
| 7100/ 80 to 7500/ 100 | 890 |
| Q/Cts 610-660 to 6100 | 495 |
| All PowerBook Upgrade | CALL |

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## Parts

| | |
|---|---|
| POWER SUPPLIES | CALL |
| AV Card | $349 |
| Bd 132 150 Mhz | 695/1085 |
| Floppy 1.44 | 89 |

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|---|---|
| Q 800/ 840/950 | 690/ 850/ |
| Preforma 6214 | 935 |
| 6100/7100 | 725/985 |
| Q700 / Si /Ci | 350/190/250 |
| 9500 120Mhz | 2090 |
| 8500 132/120 | 2450/2090 |

## Memory

| | |
|---|---|
| Dimms 16/32/64 | 94 / 90/475 |
| 30 Pin 1/ 4/16 | 8 / 28 / 129 |
| 72 Pin 8/16/32 | 85 /90 /179 |
| 2X - 4X CD | 50 /145 |
| 1000 MB - 2000 MB | 235 / 399 |
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| Zip Drive | 195 |
| Global Village Modem | 195 |

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|---|---|
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| 6100 Dos 16/500CD | 1295 |
| 7100/80 8/700CD | CALL |
| 7200/120 16/1G/CD | 1869 |
| 7500/100 16/500/CD | 1795 |
| 7600/120 16/1G/CD | 1879 |
| 7600/132 16/1.2/CD | 2775 |
| 8100/80 8/250/CD | 1495 |
| 8100/110 16/2G/CD | 2695 |
| 8500/120 16/1G/CD | 2295 |
| 8500/132 16/2G/CD | 2595 |
| 8500/150 16/2G/CD | 2995 |
| 8500/180 32/2G/CD | 4295 |
| 9500/132 16/2G/CD | 2875 |
| 9500/150 16/2G/CD | 3549 |
| 9500/200 128/4G/CD | 4689 |

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|---|---|
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| 577 5/320/CD | 995 |
| LC 580 8/500/CD | 1099 |
| 631 8/500/CD | 895 |
| 6116 8/700/CD | 1049 |
| 5200 8/500 /CD | 1295 |
| 5215 16/1 Gig/CD | 1495 |
| 5260 16/800/CD/14" | 1475 |
| 5320 16/IG/CD/15" | 1895 |
| 6200 16/1GiG/CD | 1195 |
| 6205 8/1G/CD | CALL |
| 6220 TV16/1Gig/CD | 1295 |
| 6290 8/1.2/CD | CALL |
| 6320 16/1G/CD | 1649 |
| 6400 16/1.2/CD | 2265 |
| Global fax/mdm | 17 |

## POWERBOOKS

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|---|---|
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| 5300C 16/750 | 2785 |
| 5300C 8/500 | 2695 |
| 5300CS 16/750 | 2595 |
| 5300CS 8/500 | 1840 |
| 5300 Mon 8/500 | 1155 |
| 190CS 8/500 | 1295 |
| 190 8/500 | 1280 |
| 540C 4/320 | 2295 |
| 540C 12/320/M | 2895 |
| 520C 4/160 | 1345 |
| 520C 4/240 | 1445 |
| 520 4/240 | 895 |
| 150 4/240 | 850 |
| Platinum Pro | 495 |
| Call for memory | |

## PRINTERS & MONITORS

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|---|---|
| LaseWriter 12/600 | 5899 |
| LaserWriter 16/600 | 2055 |
| L.W. 12/640 | 1495 |
| L.W. Select 300 | 475 |
| Personal 320 | 595 |
| Personal 300 | 395 |
| StylWriter 2400 | 229 |
| Radius 15" GS | 199 |
| Radius Pivot 15" GS | 295 |
| Radius Pivot 15" Clr | 369 |
| Radius 20" GS | 675 |
| Radius 21" GS | 777 |
| Radius 17" | 745 |
| Radius Precision 21" | 1495 |
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| 9500/132 16-1GB CD | $2795 |
| 9500/120 16-1GB CD | $2445 |
| 8500/150 16-2GB CD | $2845 |
| 8500/132 16-1GB CD | $2595 |
| 8500/120 16-1GB CD | $2445 |
| 7600/120 16-1.2GB CD | $2195 |
| 7600/120 16-2GB CD | $2285 |
| 7200/120 16-1.2GB CD/CD DOS | $1795/2345 |
| 6320/120 16-1.2GB CD, 28.8 | $1595 |
| Performa 6300/75 16-1GB CD, KB. | $1395 |
| Performa 6200/75 8-800 CD, KB., 15" | $1345 |
| *Performa 6220/75 16-1GB CD, KB. | $1095 |
| *Performa 6116 8-700 CD | $775 |
| Performa 5260/100 16-1.2GB CD | $1495 |
| Performa 5200/75 8-800 CD | $1195 |
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## PowerBook

| | |
|---|---|
| 5300ce/117 32-1GB | CALL |
| 5300/5300cs 8-500 | CALL |
| 520/520C 8-240 | $795/1175 |
| 520C 12-320 Modem | $1595* |
| 190/190cs 8-500 | $955/1175 |
| 150 8-500 /250 | $795/695 |
| DUO 280 4-240/280C 4-320 | $995/1345 |
| DUO 280C 12-320 Modem | $1795 |
| DUO 2300C 8-750/20-1.1GB | $2195/2995 |
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|---|---|---|---|
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| TelePort Gold 14.4 | $139 | 33.6 Fax/Modem Ext. | $179 |
| PowerPort Platinum PC | $319 | Express 14.4+ | $89 |
| PowerPort " Pro PC | $459 | Express 28.8 Ext. | $149 |
| " Gold 14.4 f/5300 | $75 | 28.8 PB Fax/Modem | $179 |

## Displays & Cards

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|---|---|
| radius PrecisionView 21/SuperMac 21TXL* | $1899/1175* |
| radius PrecisionColor Pivot 15"*/15" GS* | $145*/75* |
| radius IntelliColor 20e 20" New/Refurb.* | $1649/1049* |
| radius SuperMac 20" Color* | $695* |
| radius LeMans GT/Spigot II Tape | $495/195 |
| radius Thunder 30-1152/30-1600 | $725/895 |
| radius Thunder IVGX 1360/1600 | $695/895 |
| radius Precision Color 8-1600 | $295 |
| Apple Multiple Scan 15/15*/20 | $339/269*/1659 |
| Apple Multiple 1705/1710/1710AV | $655/795/895 |
| Number Nine Imagine 128 Card w 8MB | $859 |
| IMS Twin Turbo 128M2P (with 2MB Video RAM) | $229 |
| Targa 1000 Win./2000 NuBus Mac | $1695/1095 |
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Two 604 PPC Processor 180MHz, 32MB RAM, 2.1GB HD, 8xCD-ROM, IMS Twin Turbo w/4MB VRAM $4550

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| 7600/132 128/2GB/8xCD | $3849 |
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## Power Mac 8500 Series

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- Includes 256K level 2 cache

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- PowerPC expandable
- Passive Gray Scale Matrix display

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**Apple LaserWriter 12/640 PS**

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| LW 16/600 | $2049 |
| Color LW 12/600 | $5198 |

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**Apple MultipleScan 20 Display**

- *Refurbished with 90 Days Warranty* 0.26-mm aperture grille pitch* Upto 1,280 by 1,024 at 60 Hz * 20-in. diagonal Trinitron CRT 19.1-in. diagonal viewable image

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| Multiple Vision1710 | $849 |
| Multiple Vision1710av | $929 |
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| MultiScan 17SF II | $779 |
| PressView 215R | $2999 |
| IntelliColor 20e | $1769 |
| Rasterops MC21HR | $1989 |
| Rasterops MC20 | $1379 |
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| 32MB SIMM | $249 |
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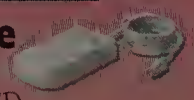

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| New Duo Type 1 Batteries | 45. |
| Centris 650 Logic Board | 299. |
| PowerBook 100 [illegible] Adapter | 49 |
| StyleWriter ink cartridges: 3 for | 29 |
| Quadra 840av Logic Board | 99. |
| ImageWriter LQ ribbon | 6 |
| Quadra 800 Logic Board | 449. |
| IIsi Power Supply | CALL |
| PowerBook Canvas Tote Case | 19. |
| Quadra 950 Logic Board | [illegible] |
| Quadra 660av NuBus Adapter | 49 |
| Quadra 660av Logic Board | 399 |
| Personal NT Logic Bd | 49. |
| Quadra 800 Logic Board | 449. |
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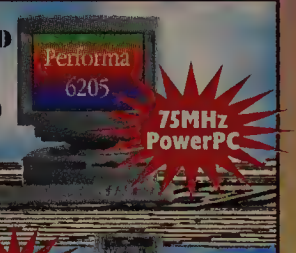


**75MHz PowerPC**

Quadra 840AV 0/0
**$999**
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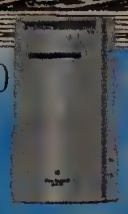

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Color StyleWriter 2400
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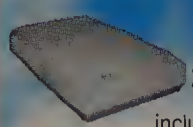
**$699**

Apple Color Printer
Brand New



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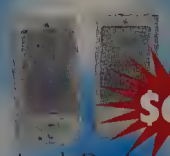

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| Mac II or IIx to IIfx | exchange $249 |
| Centris 610 to Quadra 660AV | exchange $249 |
| Quadra 660AV TO PowerMac 6100/60 | exchange $649 |
| Quadra 800/840AV to PowerMac 8100/80 | exchange $999 |
| Quadra 800 to Quadra 840AV | exchange $299 |
| Quadra 650 to PowerMac 7100/66 | exchange $799 |
| LC550 to LC575 | exchange $499 |
| IIvx, IIcx/IIci to Centris 650 | exchange $299 |
| Performa 630 to PowerMac 6200 | exchange $699 |

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| LC580 8/800/4XCD NEW | $1249. |
| Performa 635 4/250/CD | $799. |
| Performa 637 8/250/CD | $849. |
| PowerMac 6100 8/250/CD | $899. |
| PowerMac 6200 8/1GB/CD | $1099. |
| Centris 650 4/0 | $649. |
| Quadra 660AV 4/0 | $649. |
| Quadra 840AV 0/0 | $999. |
| Quadra 800 8/0 | $999. |
| Quadra 950 8/500 NEW | $1499. |
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| PowerMac 9500/120 16/1GB/CD | $2699. |
| PowerMac 9500/132 16/2GB/CD | $2999. |
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| RasterOps 24MX | $199. |
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| E-Machines DoubleColor SX NEW | $129. |
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| 7100 series AV Card | $499. |
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| Apple 14" MultiScan | $279. |
| Apple 14" MultiScan NEW | $299. |
| Apple 14" AV NEW | $399. |
| Apple 15" MultiScan | $329. |
| Hewlett-Packard 17" with card | $649. |
| Hewlett-Packard 20" with card | $899. |
| Radius TPD 19" mono | $399. |
| Radius TPD 21" mono | $549 |
| Radius PrecisionColor Display/20 | $1199. |
| Radius PrecisionColor Pivot | $549. |

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## PRINTERS

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| Apple Personal LaserWriter LS | $279. |
| Apple Personal LaserWriter 300 | $299. |
| Apple Personal LaserWriter 320 | $449. |
| Apple Personal LaserWriter NT | $499. |
| Apple Personal LaserWriter NTR | $629. |
| Apple LaserWriter IINT | $699. |
| Apple LaserWriter IINTX | $899. |
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| Apple LaserWriter Pro 630 NEW | $1499. |
| Apple LaserWriter 4/600PS | $649. |
| HP DeskWriter 310 NEW | $199. |
| Hewlett-Packard DeskWriter C | $249. |
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| PowerBook 180 4/80 | $999. |
| PowerBook 160 4/80 | $699. |
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- 1.2GB hard drive
- 4X Apple CD600i
- AppleDesign Extended Keyboard
- 15" Performa Plus Display
- Global Village Bronze Faxmodem

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- 240MB hard drive
- 4-bit gray, passive matrix
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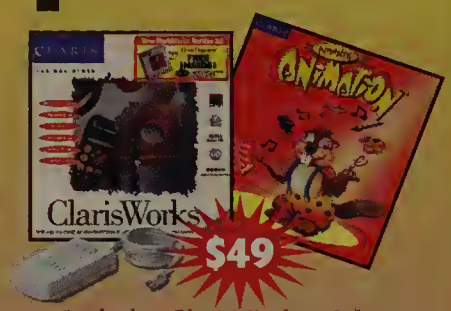


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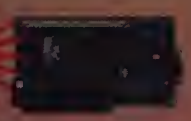

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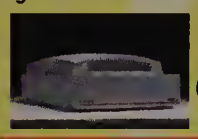

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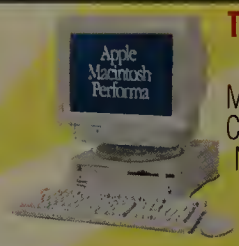


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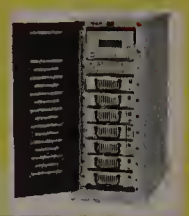

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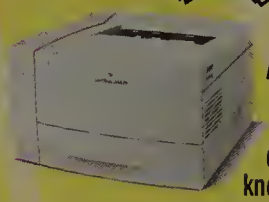

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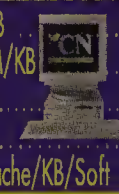

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| Quadra 840AV, 800 to 8500/120/132/150 | $1690-2090-2290 |
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| PowerMac 7200/75-90MHz to 7200/120 | $550-450 |
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| APPLE Color 12/600 | $5379 |
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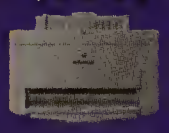

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| TARGA 2000 PRO | 3850 |
| RADIUS VIDEO VISION 2.0 | 3450 |

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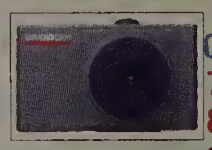

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| RASTEROPS MC17/21HR | 888/1995 |
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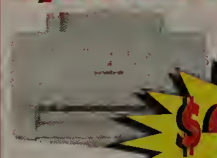

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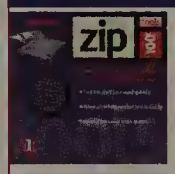

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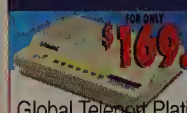

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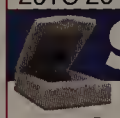

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| COLOR LW 12/600/PS | $5299 |
| Portable StyleWriter | $239* |
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| StyleWriter 2200 | $299 |
| Star Color Printer XJ144MC | $99 |
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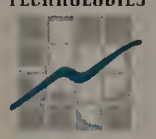

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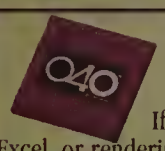

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So if the experts in Austin are slowly being replaced by body-snatched automatons with almost no comprehension of the Mac, what's to be thankful for? Three things. First, at least Apple's front-line army of phone answerers eventually hands you off to somebody who knows something. Second, Apple's help line is still free. By contrast, when my buddy recently called Compaq for help, they charged $35 to his credit card before they'd even listen to his question.

And third, the phone number itself gives hundreds of unwitting callers each week a delightful surprise: turns out that if you dial 800-S-*zero*-S-APPL by mistake, a breathy female voice thanks you for calling "America's hottest phone line."

### Virus Immunity

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### The Upshot

I'm only warming up; given a long-enough Thanksgiving-dinner speech opportunity, I'd also give thanks for such glories as shareware, Zip disks, QuickTime, the 18 voices your Mac can use to speak, PC Exchange, Macworld Expos, desktop patterns, fax modems, TrueType fonts, E-mail, the Launcher, and the little cord-wrapping prongs on a PowerBook power adapter.

Too bad Thanksgiving rolls around only once a year. The other 364 days, we'll go back to using the term *real turkey* to mean lousy software. **m**

---

Contributing editor DAVID POGUE is the author of *Macs for Dummies*, fourth edition, and its newly updated sequel, *More Macs for Dummies*, second edition (both IDG Books Worldwide). He frequently interchanges power cords.

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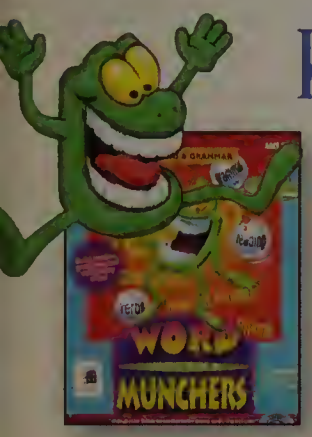


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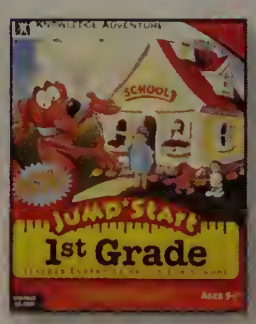


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# The Desktop Critic

by David Pogue

## Turkey, Stuffing, and Interchangeable Power Cords

THE LITTLE THINGS THAT MACINTOSH PILGRIMS CAN BE THANKFUL FOR

It hasn't been a completely pleasant year for us, the faithful Mac pilgrims. We suffered Microsoft's onslaught of bloated Windows-ware (Word 6, Excel 5). We watched Apple ingest three huge hunks of humble pie: financial fumbles, imperfect PowerBooks, and several successive servings of system software. Finally, we endured the preposterous public pillorying of Macs by the wise ones at various national news organizations, who greatly exaggerated rumors of the Mac's demise.

Still, Thanksgiving time is upon us, and we do indeed have much to be thankful for. We should remember that faith is a powerful force; the original Pilgrims didn't have much else going for them, and *their* little piece of market share hasn't done so badly. Despite our hardships, we, like they, should celebrate the little things, the surprising happinesses, the serendipitous touches that make Macs magical. Such as:

### Interchangeable Power Cords

You don't appreciate this one until you've acquired a substantial collection of Macintosh add-on junk. Once you've done so, however, you discover an astounding fact: your Macintosh, PowerBook, CD-ROM drive, scanner, printer, monitor, and other external gizmos all use the exact same kind of power cord! It's that thick round cable with three prongs on one end and three slots on the other. In any junk-heap office, in a pinch it doesn't matter which cable you grab—it'll work.

### Computers That Work in the Year 2000

Our Windows-using cohorts gloat at the apparent ubiquity of their computer format. Meanwhile, their big 90-percent-market-share ship is cruising at full speed toward an iceberg the size of Montana—namely, the year 2000. As you'll soon be hearing with increasing urgency, all those millions of less-sophisticated, non-Mac computers weren't designed to handle the turn of the millennium. When the year 2000 dawns, their software programs will rip off their little internal calendar pages and decide that it's now January 1, *1900*. Picture the calamity as millions upon millions of tax programs, spreadsheets, calendars, and salary calculations derail like a runaway train.

The Mac's designers, on the other hand, had a little more foresight. *Our* computers won't have to be junked until the year 2040.

### Styled Text

It's one of those things you probably only blink at, surprised but happy, then go right on working. You paste some text you copied from, say, ClarisWorks into an America Online E-mail you're writing. Lo and behold, the fonts, sizes, colors, and styles of the text you pasted appear perfectly in the E-mail message! What's going on here? Since when do such disparate programs communicate?

Since Apple quietly invented Styled Text, a terrific timesaving technology you hear absolutely nothing about. All manner of well-behaved programs (ClarisWorks, SimpleText, America Online, WordPerfect, DocMaker, desktop clippings) support Styled Text copying and pasting. In fact, even some not-so-well-behaved ones do (Word 6). Sign me up for the fan club.

### America Online Disks

If you're like most people I know, you just splurted your coffee involuntarily. "What?" you're saying. "I'm supposed to be *thankful* for the torrent of junk disks AOL dumps in my mailbox every week?"

You're darned tootin'! Last I looked, a box of ten high-density disks cost about $10 from MacWarehouse—but those Santa Clauses over at AOL are sending them to you for free.

### Omni-Orientation Zip Disk Cases

You're gonna think I was running short of material here, but I do, in fact, give silent thanks almost every day for this tiny gift of convenience: every time I stuff a Zip disk back into its little clear plastic case, I pay absolutely no attention to *which way* it's going in: right side up, label front, label back, rotated 90 degrees, whatever—it fits no matter which way you shove it. (If you don't consider this a blessing, recall the fussiness of SyQuest cartridge cases, plastic videocassette boxes, audiocassette boxes, and CD-ROM cases, all of which require much more mental effort to stuff and close.)

### Free Tech Support

Something bizarre is afoot over at 800/SOS-APPL. Suddenly Apple's famous help hotline seems to be staffed with an army of newcomers who know

*continues on page 270*

SUSAN LEVAN

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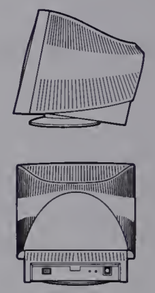

The MultiSync M Series monitors from NEC. Think of them less as new monitors, more as the standard by which all others will be judged. To learn more about either the MultiSync M500 or M700 monitors, call 1-800-NEC-INFO. To have the information sent to you by fax, simply call 1-800-366-0476 and request document #157201. Or contact us on the Internet at http://www.nec.com.

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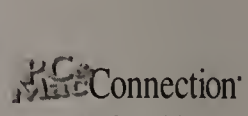


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